

THE BULLETIN

North Dakota State School of Science

A POLYTECHNIC SCHOOL

ANNUAL CATALOGUE

1914

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THE BULLETIN

North Dakota

*State School of
Science*

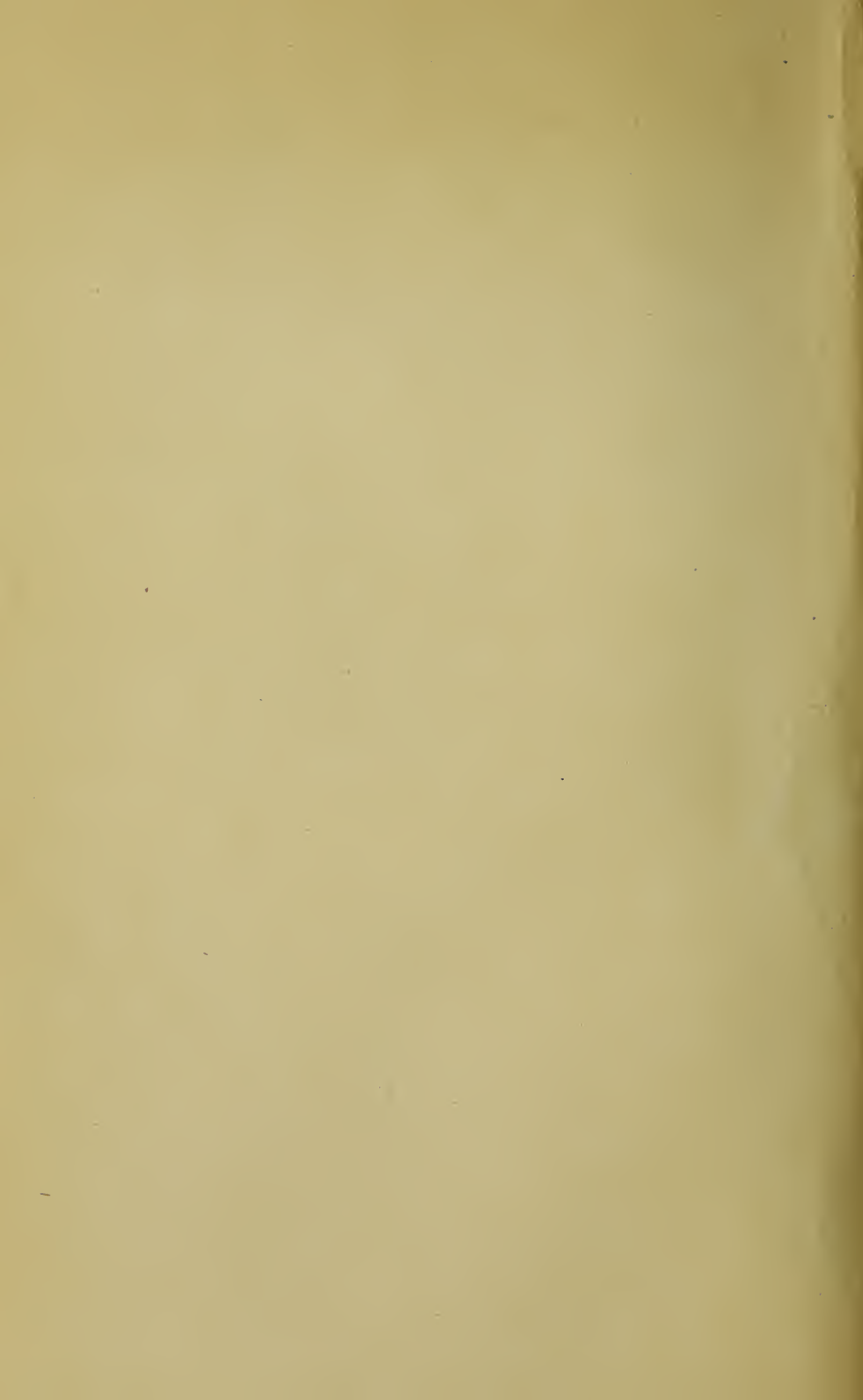
Wahpeton

ANNUAL CATALOGUE

1914

JUNE, 1914

VOL. VII, NO. 4



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1914

CALENDAR

1914

June 12—Annual Commencement.
June 17—Summer Session Begins.
July 22—Summer Session Ends.
Sept. 22—Fall Term Registration.
Sept. 23—Fall Term Begins.
Nov. 25—Fall Term Ends.
Dec. 1—Winter Term Registration.
Dec. 2—Winter Term Begins.
Dec. 19—Christmas Vacation Begins.

1915

Jan. 5—Winter Term Resumes.
Mar. 26—Winter Term Ends.
Mar. 30—Spring Term Registration.
Mar. 31—Spring Term Begins.
Apr. 6—Annual Meeting of Board of Trustees.
June 11—Annual Commencement.

BOARD OF TRUSTEES

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JOHN B. WAGNER, Lidgerwood—Term expires 1915.

JOHN J. ZENTGRAF, Tyler—Term expires 1915.

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Secretary to the President

GEORGE H. DOUGLASS
Superintendent of Buildings and Grounds

STUDENT ASSISTANTS

JOHN NESS
Blacksmith Shop

— — — — —
Wood Shop

— — — — —
Biology Laboratory

LEO H. KLEIN
Chemical Laboratory

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SUMMER SCHOOL, 1914**

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Deputy County Superintendent
Primary Methods

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ALMA E. PORTER
Lidgerwood City Schools
Domestic Science and Music

TILLIE SNYDER
Wahpeton City Schools
English

General Information

Location

The School of Science is located in the southeastern part of the state of North Dakota, in the City of Wahpeton, the county seat of Richland County.

Wahpeton is famed for its shady streets, its beautiful homes, and its excellent school system. It is easily accessible by means of four great railway systems which form a net work over the entire state.

The system of artesian wells which supply an abundance of pure water, together with the newly constructed sewer system, makes Wahpeton one of the most beautiful cities of the state, and an ideal location for an institution of learning.

History

The Convention which framed the constitution for North Dakota located the State School of Science at Wahpeton and endowed it with 40,000 acres of the Congressional grant of public lands for institutions of higher learning in the new state.

The legislative act providing for the new school was approved March 10, 1903, and the institution was opened in the following September. The work of the first two years was carried on in rented rooms, but in June 1905 the trustees purchased the building and property of the Red River Valley University.

Campus and Buildings

The school now owns about twenty-five acres within the city limits for its campus and grounds. With its quadrangle

bordered by buildings and its shade trees and walks the campus promises to become one of the beauty spots of the region.

The Administration Building is an imposing structure of red brick, four stories in height. It contains the offices, the library, the laboratories for physics, biology and electrical engineering, and a large number of recitation rooms.

The Mechanics Building is a one-story structure of cement blocks, and affords housing for the wood and iron-working machinery, the forge shop, the steam engineering laboratory and the engine room.

The Chemistry Building is built of Hebron brick, and is devoted entirely to the work in chemistry, offering abundant laboratory space and a well-equipped recitation room.

Burch Hall is a commodious building 114x44 feet, built of Hebron brick, three stories high above a well lighted basement. In this building are located the general dining hall and kitchen for the school. The Domestic Science department has excellent accommodations on the first floor, and the upper floors accommodate about sixty girls with dormitory rooms and parlors.

The Power House provides heating facilities for all the buildings and power for the engines in the steam engineering laboratory.

The Gymnasium is a large and commodious structure of Hebron brick. It has been in use for two years, and when completed will contain all features of a first-class gymnasium. Its main room will provide seating capacity for the largest school gatherings. The Gymnasium provides for all the needs of the athletic teams, and affords opportunity for physical culture for all the students.

Object

The purpose of the institution, as defined by statute, is to furnish such "instruction in the pure and applied sciences, mathematics, languages, political science, and history as is usually given in schools of technology below the junior year, the chief object being the training of skilled workmen in the most practical

phases of applied science."

In accordance with this object the courses offered are vocational in their trend and purposes, and several distinctively trade courses are given. While the school aims to train young people directly for their vocation, at the same time by an election of subjects from those offered to meet the needs of vocational training, courses coordinate with those offered in the early years of a general college course may be selected if desired.

Admission

Students may enter at any time provided they are prepared to join classes already established. It is, however, very strongly urged that all work should be begun promptly at the beginning of the term. Those who enter late lose much that cannot be regained. The arrangement of terms makes it possible for winter term students to enter as soon as the fall's work is finished and continue until spring, thus enabling them to complete the special courses in one term and the elementary engineering course, or the agricultural course in three winter terms.

Special students may be admitted to the classes for which they are prepared. They are subject to the same rules as the regular students, and, unless excused by the faculty, are required to take studies enough to occupy all their time.

A certificate of good moral character must be presented by the student.

Fees

Tuition is free in all courses except those of the commercial department.

INCIDENTAL FEES. A fee of \$2.50 per term is charged all students.

LATE REGISTRATION. Those students who register late, except those entering for the first time, will be charged \$1.00 additional.

DEPOSIT. A deposit of \$5.00 as a guarantee against loss or damage to the room or its contents is required of each student rooming in the dormitories.

COMMERCIAL FEES. The separate fees in the courses of this department are as follows for each term: Bookkeeping or Stenography, \$5.00; Typewriting, Penmanship, etc., each \$1.00. Rent of typewriter, \$1.00. Telegraphy, \$5.00.

DOMESTIC SCIENCE FEES. The students in cooking classes pay a fee of \$1.50 for the fall or spring term, and \$3.50 for the winter term. The fee for model sewing is 25 cents, for millinery 25 cents, and for dietetics, \$1.50.

The Snow system is required in sewing, and a uniform is required for this department, descriptions of which will be found under the description of the courses.

ELECTRICAL ENGINEERING FEES. The student in electrical engineering is charged a laboratory fee of \$1.00 per term.

LABORATORY FEES. In chemistry the student pays for material consumed, and a deposit of \$3.00 is required, and the unused portion of the deposit fee is returned at the close of the course.

In preparatory physics or biology a fee of \$0.75, and in college physics or biology a fee of \$1.50 per term is charged.

SHOP FEES. To cover the cost of materials used, a fee of \$2.00 per term for wood or iron work is charged.

SURVEYING. A fee of \$2.00 is charged in this course.

All fees must be paid in advance at the time of registration.

Students who voluntarily drop a subject after two weeks are not entitled to a return of fees. Otherwise one half the amount is returned.

Discipline and Attendance

Students are expected at all times and in all places to conform to the usages of good society.

Repeated offences will result in suspension or expulsion.

It is required that regular school work shall take precedence over all other matters and students negligent in work or conduct are liable to a loss of privileges and standing.

Students are required to be regular and punctual in attendance. A complete record is kept of each student, showing his

attendance, application, progress in studies, and general deportment. A copy of this report is sent to parents or guardian each month, if requested.

Gymnasium and Athletic Field

A commodious gymnasium has been provided and equipped with a variety of well selected apparatus. It will furnish accommodations for basketball, handball and various other indoor games. Classes are formed in which carefully graded exercises are practiced, and by means of which a symmetrical and normal physical development is attained. A new gymnasium 60x100 feet furnishes all modern athletic equipment including separate baths and drying rooms for boys and girls and teachers.

A director of athletics will have general supervision of all athletic interests. An athletic field provides facilities for baseball, football and track events, and there are tennis courts on the campus.

Board and Rooms

The school furnishes board and room to about 100 students.

Each student upon entering the dormitory must deposit \$5.00 as a guarantee against loss or damage to the room or its contents. Board will cost \$3.50 per week and is payable one month in advance, otherwise ten per cent additional charge is made. No deduction is made for absence of less than a full week.

The rooms are heated by steam and lighted by electricity, and are furnished with the usual bedroom furniture. The student is required to furnish bed clothing, pillow and towels, and should bring any desired additional room decoration. Students rooming in the dormitory must take full work.

Student Organizations

LITERARY SOCIETIES. For the purpose of securing further practice in public speaking and parliamentary forms three literary societies are maintained. Two of these are of sub-collegiate grade and one for college students.

ATHLETIC ASSOCIATION. All bona fide students are mem-

bers of the athletic association. Its object is to promote all legitimate athletic interests of the institution. Athletic affairs are under the supervision of a board of control elected by the faculty, consisting of one member from the faculty and two members from the student body.

The school is a member of the Dakota-Minnesota Athletic Conference, and also of the Interstate Normal School Conference. These conferences maintain championship contests in which the State School of Science has always taken an active part.

ORATORICAL ASSOCIATION. This association is a most efficient means for the development of the art of public speaking and debate. The school is a member of the state inter-collegiate oratorical association.

Y. W. C. A. The young women of the school maintain a strong association which fosters and encourages the spiritual and social life of its members.

THE BAND. The school maintains a cornet band of about forty-five members, as well as a second practice band of from twenty to thirty members. The first band rehearses every day during the entire school year. The second band is organized the first week of the winter term and continues through the winter term. Students of the second band are placed in the first band as soon as the required proficiency is acquired. Only the very best grade of music is used by both the beginning and advanced bands. The concert band is given an opportunity to appear at various school functions both in Wahpeton and elsewhere and conducts a series of open air concerts each spring.

Students taking the regular band work are given credit in their course of study. No charge whatever is made for band instruction or for the use of band music.

Prizes

ORATORICAL PRIZES. To the student obtaining first place in the local oratorical contest a gold medal is awarded. The suc-

successful contestant represents the school in the state oratorical contest.

PRIZE IN DECLAMATION. A prize is awarded to the student in the preparatory department who wins first place in the declamation contest held during commencement week.

Library

The general library containing over 6,000 bound volumes and pamphlets is open to the students from 8 o'clock a. m. until 4 o'clock p. m. The room is large and attractive, and is fitted with iron book stacks, tables, chairs and all necessary library furniture. An excellent collection of reference books is conveniently accessible. The library is in charge of a trained librarian who assists students in finding desired information. An extensive list of periodicals and current literature is provided.

General Assembly

On Wednesday at 10 o'clock all students are expected to assemble for brief devotional exercises. At this time announcements of general interest are made and it is intended that there shall be a speaker present who will address the student body upon some topic of interest.

Rhetoricals

In lieu of membership in a literary society the right is reserved to require rhetorical exercises consisting of readings, essays, debates, speeches and demonstrations each alternate week under the direction of the members of the faculty. Every student in whatever course enrolled is expected to be present and take such part in these exercises as may be assigned by the teacher in charge.

Lecture Course

A strong lecture course was given during the winter of 1913-14. It was greatly appreciated by the student body and the citizens of the city, and a course consisting of several high grade numbers has been arranged for the winter of 1914-15.

Students in the school are admitted to the entire course on

tickets issued from the office. The entertainments and lectures constitute a valuable part of the intellectual and social life of the institution.

Special Bulletins

Special bulletins more fully describing the courses in elementary agriculture; business and shorthand; domestic science; mechanical and electrical engineering; trades and vocational courses; and the Summer School, have been published and may be obtained by applying to the President.

Visitors Welcome

We are always glad to have the parents and friends of our students visit the school while in session. We take pleasure in explaining our methods, and showing the work of our students.

Courses

Instruction in the school is organized under the following courses:

ACADEMIC—

- Two year Junior College Course,
- Three year Secondary Course,
- One year Elementary Teachers' Course.

AGRICULTURE—

- Three year Secondary Course,
- Three Winter Term Short Course.

COMMERCIAL—

- Two Year Commercial Course,
- One Year Course (elective.),
- Telegraphy.

DOMESTIC SCIENCE—

- Foundation Teachers Course,
- Home Makers Course,
- Home Makers Short Course.

ENGINEERING—

- Two year Mechanical Engineering Course,

One year Mechanical Engineering Course,
Two year Electrical Engineering Course,
One year Electrical Engineering Course,
Three year Secondary Engineering Course,
Steam and Gas Engineering Short Course,
Electrical Engineering Short Course,
Automobile Repairing.

TRADE—

Carpentry and Building Course,
Bricklaying and Plastering Course,
Plumbing and Steam Fitting Course,
Trade Course in Practical Electricity.

Junior College Course

This course comprises two years of junior college work. The work is elective and the student selects his work with the advice of the faculty and in view of the vocation which he subsequently proposes to pursue. In all courses the proper sequence of subjects must be followed. No course will be given unless elected by at least three students, except by special action of the faculty.

It is strongly urged that students should early in their course select at least one year of work in each of the following departments: Mathematics, chemistry, history, biology, English and two years in either German or French, except when two years of German or French are offered for entrance.

Requirements for Admission to College Courses

The candidate must present three credits in each of the following subjects: Algebra, geometry, English literature, English masterpieces, rhetoric, physics, general history. In addition to the above, twenty-four credits must be offered. A credit is four or five recitations per week in a subject for one term.

Two full years' work is required to obtain the diploma of this course.

OPEN TO FIRST YEAR STUDENTS

FALL	WINTER	SPRING
English I (4)	English I (4)	English I (4)
German (5)	German (5)	German (5)
French I (5)	French I (5)	French I (5)
Latin I (4)	Latin I (4)	Latin I (4)
Mathematics I (5)	Mathematics I (5)	Mathematics I (5)
History I (4)	History I (4)	History I (4)
Chemistry I (5)	Chemistry I (5)	Chemistry I (5)
Biology I (5)	Biology I (5)	Biology II (5)
Political Science III (4)	Political Science IV (2)	Political Science V (4)
Library Economy (4)	Library Economy (4)	Library Economy (4)

OPEN TO SECOND YEAR STUDENTS

English II (5)	English II (5)	English II (5)
German (4)	German (4)	German (4)
French (4)	French (4)	French (4)
Latin II (4)	Latin II (4)	Latin II (4)
Spanish I (5)	Spanish I (5)	Spanish I (5)
History II (4)	History II (4)	History II (4)
Biology III (5)	Biology III (5)	Biology IV (5)
Chemistry II (5)	Chemistry II (5)	Chemistry II (5)
Physics I (5)	Physics I (5)	Physics I (5)
Mathematics III (5)	Mathematics IV (5)	Mathematics IV (5)
Psychology (5)	Education II (5)	Education II (5)

NOTE—Courses which have not been chosen in the year in which they are first offered as electives may be taken in a later year.

SUGGESTED COURSE IN SCIENCE**First Year****FIRST SEMESTER**

English I.
German
Mathematics I.
Chemistry I.
Biology I.

SECOND SEMESTER

English I.
German.
Mathematics II.
Chemistry I.
Biology II.

Second Year

German or English.
Mediaeval or English History.
Psychology.
Electives (any two)
Biology III.
Chemistry II.
Physics I.
Mathematics III.

German or English
Modern or American History
Education II.
Biology IV.
Chemistry IV.
Physics I.
Mathematics IV.

SUGGESTED GENERAL COURSE**First Year**

English I.	English I.
German, Latin or French.	German, Latin or French.
Mediaeval History.	Modern History.
Political Science.	Sociology.
Elective:	
Mathematics, or	Mathematics, or
Science	Science.

Second Year

English II.	English II.
German, Latin or French.	German, Latin or French.
Psychology.	Education II.
English History.	American History.
Elective:	
Mathematics, or	Mathematics, or
Science.	Science.

Secondary Course

Many students who apply for admission have not been able to secure the advantages of a high school preparation at home and therefore it has been found necessary to outline a secondary course. This course is particularly strong in mathematics, modern languages, and the sciences, while an excellent opportunity is afforded for instruction in drawing and the mechanic arts.

Admission and Graduation

For admission to the secondary courses, the student must pass an examination in arithmetic, English Grammar, geography, United States history, orthography, and physiology. Certificates of approved standing will be accepted in lieu of an examination.

Candidates for graduation from the secondary course must present three credits in each of the following subjects: Algebra, geometry, English literature, English masterpieces, rhetoric, physics and general history. In addition to the above twenty-four credits must be offered. A credit in one term's work in a subject with four or five recitations per week.

A diploma is granted upon the satisfactory completion of the course.

Secondary Course

JUNIOR YEAR

FALL TERM

Rhetoric	4
Algebra (a)	5
German	5
Latin (a)	5
Biology (e)	5
Drawing	2½
Bookkeeping	2½
Domestic Science	2
Shop work	2½

WINTER TERM

Rhetoric	4
Algebra (a)	5
German	5
Latin (a)	5
Chemistry (c) Soils..	5
Agriculture (b)	5
Drawing	2½
Bookkeeping	2½
Domestic Science	2
Commercial Law	5
Shop work	2½

SPRING TERM

Rhetoric	4
Algebra (a)	5
German	5
Latin (a)	5
Drawing	2½
Bookkeeping	2½
Domestic Science	2
Shop work	2½
Penmanship	½
Orthography	2½
Pedagogy	5

MIDDLE YEAR

English Literature	4
Geometry (b)	5
German	4
Caesar	5
French	5
Domestic Science	3
Biology (c)	5
Stenography	2½
Shop Work	2½

English Literature	4
Geometry (b)	5
German	4
Caesar	5
Agriculture (d)	3
French	5
Stenography	5
Domestic Science	3
Forging ..	2½

American Literature	4
Geometry (b)	5
German	4
Cicero	5
French	5
Stenography	5
Domestic Science	3
Shop Work	2½
Biology (a)	5

SENIOR YEAR

English Masterpieces..	4
Ancient History	4
Physics (a)	4
Cicero	5
French	5
Chemistry (a)	5
Industrial History	5
Drawing	2½
Shop Practice	2½

English Masterpieces..	4
Ancient History	4
Physics (a)	5
Virgil	5
Agriculture (e)	5
French	4
Chemistry (a)	5
Shop Practice	2½
Civics	5

English Masterpieces..	4
Ancient History	4
Physics (a)	5
Virgil	5
French	4
Economics	5
Chemistry (a)	5
Biology (g)	3
Shop Practice	2½

NOTE—The first two subjects in each term and *Physics (a)* are required. Numbers indicate recitation credits per week.

Agricultural Courses

To meet the conditions and requirements in an agricultural community, two practical courses in elementary agriculture are offered. These courses are intended to give both practical direc-

tion to the general studies and helpful training to those who wish more definite knowledge of agricultural problems. For outline of the courses, see page 24 and the descriptions of the studies under their appropriate departments.

The Commercial Course

The commercial department is maintained with the belief that many young people of this state will be greatly benefitted by it.

The commercial courses are very strong along practical lines.

In these courses the student may get a thorough business training without paying the high price charged for tuition by private business colleges. While the cost of attending this institution is considerably less, the instruction is as good or better than that received in business colleges. For complete outline of the commercial courses, see page 35.

Domestic Science Courses

The Domestic Science department now offers three courses: one for those students having a high school training who desire to make a specialty of domestic science and its pedagogy; one for those who primarily wish to secure practical training in regard to the proper administration of the affairs in the home; and a third course for those girls who desire a scientific training in home economics, and can leave home only during the winter months. This short course is completed in two consecutive winter terms of four months each. For complete outlines of these courses see page 42.

Engineering, Electrical and Mechanical

The practical application of electricity and mechanics to the problems of modern life are opening an extensive field for ambitious young men. The complete college course requires so much outlay in time and money that many are unable to undertake a college preparation. There is, however, a very large field where advanced technical training is unnecessary and one in which students of moderate attainments will find remunera-

tive employment. To fill the needs and demands of the above, the school is now offering one and two year courses both in electrical and mechanical engineering based on a high school preparation. In addition the short three winter term courses in electrical engineering, and steam engineering are offered as heretofore. For complete outlines of these courses see under the appropriate department.

Trade Courses

During the last decade the demand for skilled men in the building trades has exceeded the supply. Formerly it was the custom for young men who desired to learn one of the building trades, to start in as an apprentice and work his way up. At the present time, however, this is nearly impossible, for the chances are against him. The time of the high-priced workman of today cannot be taken up and the work delayed to teach beginners. To meet the demand for training in such practical courses the school is offering four trade courses: a course in Carpentry, one in Bricklaying and Plastering, a course in Plumbing and Steam Fitting, and Practical Electricity. Other trade courses will be introduced as the demand necessitates. For outline of the trade courses see pages 79 and 84.

Teachers' Course

In connection with the preparatory work of the various departments, classes in the common branches are maintained at certain times of the school year. By selecting the branches when offered a student is able to get all the studies required for a first or second grade elementary certificate.

Courses of Instruction

The departments of instruction are arranged in alphabetical order. The letter preceding the course indicate that it is given in the preparatory department. Roman numerals indicate college courses.

Agriculture

The department of Practical Agriculture was organized in 1910, with the view of providing practical industrial agricultural training for the young men of this state on the farm, especially for those who desire a scientific agricultural training, yet cannot attend school the regular school year and hence are prohibited from obtaining a regular high school course, preparatory to a four years collegiate training in agriculture.

The agricultural courses are arranged to provide practical work for the young men and boys who wish to become successful farmers. The courses aim to meet the demand for such information and skill in agricultural training as can be immediately applied to farm life and yet not entirely exclude the more broadening and cultural lines of work that have general educational value and fit for efficient citizenship.

The courses are planned for students preparing to live in the country whether that living contemplates actual farming, farm management, or some more technical application of scientific farming, and should particularly appeal to young men of experience who have quit school upon finishing the grades or high school and after a time discover that they desire a scientific training in agriculture and need further school training. In general

they offer valuable training for those who desire to become managers of live stock ranches, fruit orchards, large farms, and other agricultural enterprises.

Requirements For Admission **—Short Three Winter Term Course**

The student desiring to take this course must present evidence of his ability to do the work required successfully. If the candidate be a young man he should have at least completed his common school work and be prepared to enter any well established high school. Persons of more mature years will be permitted to enter with perhaps less preparation in the hope that their better judgment and more diligent application will enable them to successfully carry on the work.

This course is adapted to those students who can only leave the farm during the four winter months, and yet desire to secure a knowledge of the practical fundamental and scientific principles of agriculture.

FIRST WINTER	SECOND WINTER	THIRD WINTER
Arithmetic 5	English Composition..5	Civics 5
Physics 5	Crops 5	Farm Mechanics 5
Farm Animals 3	Botany 3	Farm Accounts 3
Dairying 2	Soils 5	Zoology 2
Wood Shop 2½	Forge Shop 2½	Machine Shop 2½
Business Law 5	Drawing 2½	Physiology 5

The Three Year Secondary Course

During the past few years there has arisen in our state a demand for agricultural courses of secondary grade. The following course has been carefully outlined to meet the demand. It is well adapted to meet the cultural and agricultural requirements of a boy or girl expecting after graduation, to live on the farm. It also contains enough of the general culture subjects to meet the entrance requirements of higher educational institutions, should the student later desire a collegiate course.

Junior Year**FIRST TERM**

Rhetoric	4
Algebra	5
German	5
Shop work	2½
Drawing	2½

SECOND TERM

Rhetoric	4
Algebra	5
German	5
Farm Animals	3
Dairying	2
Shop work	2½
Drawing	2½

THIRD TERM

Rhetoric	4
Algebra	5
German	5
Shop work	2½
Drawing	2½

Middle Year

English Literature ...	4
Geometry	5
German	5
Shop Work	2½
El. Physiology	5

English Literature ...	4
Geometry	5
German	4
Forge Shop	2½
Crops	5
Civics	5

English Literature ...	4
Geometry	5
German	4
Shop Work	2½
Bookkeeping	5

Senior Year

English Masterpieces..	4
Physics	5
Elem. Zoology.....	5
Ancient History	4
Indust. History	5

English Masterpieces..	4
Physics	5
Farm Mechanics	5
Ancient History	4
Soils	5
Business Law	4

English Masterpieces..	4
Physics	5
Elem. Botany	5
Ancient History	4
Economics	5

a. Elementary Agriculture

This course, offered for those students desiring elementary teachers' certificates, comprises a survey of the elementary and practical phases of scientific agriculture. A study is made of the soil and its cultivation in respect to the best development of various crops. Emphasis is placed on the growth, care and feeding of crops and stock grown in North Dakota. Special attention is paid to the laboratory work, simple problems and methods suitable for adaptation in the rural schools of the county.

Winter and Spring terms five hours per week.

b. Crops

In this course a study is made of the principles and effects of tillage and rotation of crops; farm crops; grasses; cereals; forage crops; root and tuber crops; fibre crops; alfalfa and other leguminous plants, including history; uses, selection, storing and testing of seeds; preparation of seed bed and planting; cultiva-

tion; harvesting; meadows and pastures; methods in plant improvement; weeds and methods of eradication.

Text book, recitations and laboratory.

Winter term two hours per week.

c. Farm Animals

An introductory course in animal husbandry. The course will be given by means of text book, recitations and field work. Topics studied are: Importance of animal husbandry; breeds of horses, cattle, sheep, and swine; methods of judging live stock; breeding; feeding standards, how to calculate a ration; poultry, types and breeds.

Text: Plumb's Beginnings in Animal Husbandry.

Winter term, three hours per week.

d. Dairying

A two hour course during the winter term. Topics to be discussed are: Composition and secretion of milk; testing the farm herd; the separator; skim milk; the barn; the silo; feed; tuberculosis and other practical questions dealing with different phases of dairying.

Winter term, two hours per week.

e. Agricultural Engineering

This course aims to present in simple terms the engineering facts and principles that are essential in farm management. The following subjects are studied: Agricultural surveying, drainage, irrigation, road construction, farm machinery, including elements of machines; materials and lubrication; wagons, buggies, pumps; farm motors, steam and gas tractors, farm structures, and farm sanitation, etc.

Text: Agricultural Engineering, by Davidson.

Winter term, five hours per week.

BIOLOGY

The work in this department comprises the subjects of zoology, botany, physiology and bacteriology. The facilities and equipment are specially good. The general laboratory is provid-

ed with compound and dissecting microscopes, dissecting instruments, complete imbedding apparatus and microtome, camera lucida, drying oven, reagents and mounting material, and a complete equipment of bacteriological apparatus. It includes autoclave, steam and hot air sterilizers, incubator, high power immersion objectives, and an abundance of necessary glassware.

The biological library contains several hundred standard reference books and special papers which are used as a reference library by the students.

In zoology there is provided a fairly complete series of skeletons and charts illustrating the various types of vertebrate and invertebrate structure. There is available a collection of fishes and marine invertebrates from the U. S. National Museum. There are also collections of invertebrates from a variety of localities, which are valuable for demonstration purposes.

In biology the work is largely done in the laboratory. Careful notes and drawings are required and the laboratory work is supplemented by references, recitations, and lectures.

The following courses are offered:

a. Elementary Botany

This course comprises a study of, The Seed, its germination, growth and function; The Stem, its growth, structure and function; The Root, its structure and work; The Bud; The Leaf; The Flower; The Fruit. A brief survey of Fungi and their relatives. These topics are studied in relation to the local flora. In addition a small collection of local plants is gathered, identified, and mounted.

Spring term, recitations and laboratory, five hours.

b. Agricultural Botany

A course designed to meet the needs of students in Agriculture dealing with the function, structure and physiology of plant life. Special attention is given to plants of economic value, and also to the common plant diseases found upon the farm.

Winter term, recitations and laboratory, three hours.

c. Elementary Zoology

The course has been arranged to give the student an appreciation of some of the more interesting and common forms of animal life. Several of the common forms are studied in relation to their life history, habitat, anatomy, physiology and general classification, with a view to impressing upon the student the importance of animal life and its relation to economic questions.

Fall term, recitations and laboratory, five hours per week.

d. Agricultural Zoology

A study of the structure and physiology of a few common forms, and a discussion of their importance in relation to the problems of economic interest. Grasshoppers, crayfish, frogs, mice and birds are studied in the laboratory.

Winter term, recitations and laboratory, three hours per week.

e. Elementary Physiology and Hygiene

A study of the elementary principles of Hygiene and Physiology as relating to the skeleton, the digestive, nervous, circulatory and excretory systems. By means of laboratory work and demonstrations a study of the skeleton and anatomical preparations is made.

Fall term, five hours per week.

f. Elementary Physiology

An elementary course for the Home Makers and three year winter term course in Agriculture. Studies will be made of the skin and kidneys; the skeleton; the muscles; the circulation; the respiration; food and digestion; the nervous system; the senses; bacteria and sanitation.

Winter term, three hours per week.

g. Industrial Hygiene and Sanitation

Personal hygiene, school hygiene, hygiene for the worker, morphology of bacteria and conditions determining their growth, life and death; the spread and control of infectious diseases;

water, milk and ice supplies; sewage disposal; plumbing, heating and ventilation are the topics to be considered.

Fall term, three hours per week.

General Biology

General Biology comprises courses I and II. This is an introductory course designed for students desiring a general culture course. For students who later desire to specialize, it offers a general survey of the practical and fundamental principles relating to plant and animal life.

I. Botany

This course gives a study of the general principles of biology as illustrated by plants.

First semester, recitations and lectures two hours per week; laboratory, six hours per week.

II. Zoology . .

This course continues course I and gives a study of the general principles of biology as illustrated by types of animals.

Second semester, recitations and lectures, two hours per week; laboratory, six hours per week.

III. Physiology and Hygiene

An advanced study in human physiology and hygiene. The subject is studied by means of laboratory, assigned readings, text books, and recitations. The laboratory work comprises a brief histological study of the human body, beginning with a study of the structure, physiology, and function of the cell, tissues and chief organs of the body. In addition certain experiments, illustrating the more common physiological processes are formed. The recitations are devoted to a study of the chief physiological and hygienic problems relating to the digestive vascular, respiratory, excretory and nervous systems.

First semester, recitations and lectures two hours per week; laboratory, six hours per week.

IV. Bacteriology

A general introductory course, paying special attention to bacteria, yeasts and moulds. A considerable amount of laboratory work, supplemented by reference readings, recitations, lectures, and demonstrations, is applied to a study of the form, habits, and use of bacteria, yeasts, and moulds, in their relation to home economics.

The laboratory work enables the students to make a practical study of the action of yeasts, moulds, and bacteria in the preparation and preservation of food, also a practical study of the cause and prevention of disease, including disinfection, disposal of sewage, and a bacterial analysis of air, milk, water and soil.

Second semester, recitations and lectures two hours per week; laboratory, six hours per week.

CHEMISTRY

The department of chemistry occupies a separate building. The laboratories are large, well ventilated and lighted, and sufficiently equipped to enable students to pursue successfully the courses offered. Students have access to a well selected reference library consisting of standard works in chemistry and current chemical journals.

a. Elementary Chemistry

This course is the equivalent of what is usually given in a good high school. The fundamental theories of chemistry and the common elements are considered. The chemistry of daily life, consisting of the study of foods, plants, water, air, soil, etc., is taken up in an elementary way. The course is open to juniors and seniors in the preparatory department.

Five hours per week throughout the year.

b. Engineering Chemistry

This is a short course alternating with the course in soils. It will be given in 1915-16. It consists of a study of fuels, oils,

gases, cements, iron, etc., besides other topics in which the class may be interested. These topics will be taken up in such a way that the student with no training in chemistry can grasp some of the underlying principles.

Winter term, 1915-16, five hours per week.

c. Agricultural Chemistry and Soils

Agricultural chemistry and soils is given during the winter term. It alternates with engineering chemistry. Enough work is done in chemistry to enable students to understand the origin of soils, the theory of permanent agriculture, the availability of plant food, etc. The fundamental facts of plant and animal nutrition are taken up. The course is intended for students of agriculture, for preparatory students, and for college students who are interested in the subject.

Winter term, 1914-15, five hours per week.

I. General Chemistry

This course is the equivalent of what is commonly given during the first year of college work. It aims to familiarize the student with the fundamental principles of chemistry, and to give him the working knowledge which is a prerequisite for further work in chemistry. It is also a complete course in itself, enabling students who wish to take only one year of chemistry, to get an understanding of the subject, and to get intelligent ideas of the many chemical problems arising in our present day civilization. The course consists of lectures, oral quizzes, and laboratory practice. The laboratory work is divided into two semesters. The first semester consists of a study of the properties of the common elements. Wherever possible this is done in a quantitative way, so that the student is prepared to take up the quantitative work of the second year. The second semester is a complete course in qualitative analysis.

Five hours per week throughout the year.

II. Qualitative Analysis

Qualitative analysis is given as a part of the general chemistry course. In place of taking laboratory practice in general chemistry, the student takes qualitative analysis. The work consists of a separation of the bases and acids, as well as some practice in the preliminary examination of substances to be analyzed.

Second semester, three hours per week.

III. Quantitative Analysis

The beginning class in quantitative analysis comes during the first semester. Students wishing to do further work may continue throughout the year, along the lines suggested below. Quantitative work usually requires extra time. The following courses are offered.

ORE ANALYSIS—

Ores of iron, manganese, zinc, lead, etc., are analyzed quantitatively. Other ores or fuels may be substituted. This work is intended for students in the engineering courses or for students wishing to train themselves along chemical lines.

AGRICULTURAL ANALYSIS—

Soils, foods, and agricultural products in general are handled quantitatively. Credit is given according to the amount of work completed.

ROCK AND MINERAL ANALYSIS—

Students interested in geology or mineralogy may analyze rocks, such as limestone, granite, etc. The common minerals also offer a good field for work. This work requires the same technical skill as the analysis of ores or soils.

WATER ANALYSIS—

A thorough course in water analysis is offered. It is to be supplemented by the work on water given in the course in Bacteriology. This course may be taken at any time during the year.

Prerequisite for all quantitative work: General chemistry and qualitative analysis.

IV. Organic Chemistry

One semester is devoted to organic chemistry. The course is designed for students of domestic science, its chief purpose being to give a preparation for the work in the chemistry of food and digestion. At the same time the student gets a good view of the field of organic chemistry, and an insight into some of the possibilities in that field. This course may be elected by any college student who has completed general chemistry. In conjunction with Course V it makes an excellent year's work, giving an insight into the many problems of our daily life, our foods, our nutrition, etc.

Prerequisite: General Chemistry.

Five hours per week. First semester.

V. Chemistry of Food and Digestion

This is largely a laboratory course, consisting of a study of the chemistry of fats, proteins, starches, spices, baking powder, food preservatives, etc. The adulteration and the detection of adulterants receives special attention. The latter part of the semester is devoted to the study of the chemistry of digestion.

Five hours per week, second semester.

VI. Mineralogy

The laboratory is supplied with the most of the common minerals and rocks. Students having had qualitative analysis can avail themselves of the opportunity to become familiar with these at any time. At the same time they may take a systematic course in the identification of minerals.

COMMERCE AND SHORTHAND

This department is maintained with the belief that many young people of this state will be greatly benefited by it.

The purpose of this course is to afford facilities for training young men and women to carry out in a safe and systematic manner the ordinary business transactions that must arise every day of their lives. We believe that in order to achieve the largest

measure of success and in order that he may well perform his duties to himself and his neighbors, the farmer and tradesman, as well as the man in the office, should have a business training adapted to his needs. With this in view we are offering a course of study, including among other subjects, Commercial Law, Accounting, and Business Correspondence, all of which are as valuable to the farmer or mechanic as to the merchant or banker. By keeping accounts the head of the family should be able to reduce the cost of living by knowing to a certainty the sources of waste. By having a knowledge of commercial law a man and his neighbor may be able to avoid costly litigation. The advantages of being able to compose a good business letter cannot be over estimated. While we do not encourage boys and girls to leave the farms or smaller towns for the cities, yet the training received in the advanced courses of this department will fit them for positions in offices and banks should they desire to enter these fields of business.

Careful and thorough instruction is given in all the branches of these courses, and thorough work is required of all students. It is estimated that it will take the average student nine months, or one school year, to finish either one of the two years of this course.

Any one who has COMPLETED THE EIGHTH GRADE may enter this department. No examination is required on entering the department unless the student wishes to be excused from some subject. Examinations are held at the end of each term in Shorthand, Spelling, Commercial Law, English Grammar, Commercial Geography, Letter Writing and Business Arithmetic. A final examination will be given in Bookkeeping at the end of the student's work.

Students taking the commercial courses pay \$8.00 tuition for a term of twelve weeks. This includes the incidental fees, and makes the total tuition for a year \$24.00. Business Colleges throughout the country charge from \$60.00 to \$100.00 for the same instruction, so you see the great saving in tuition, as well as the advantage to be had in attending a state institution.

A rental of \$1.00 per term will be charged for the use of typewriters. Students from other courses who elect one subject in the commercial course will be charged as follows:

Bookkeeping or Stenography, \$5.00 per term. Telegraphy, \$5.00 per term. Typewriting, Commercial Law, Commercial Arithmetic, Spelling, Letter Writing and Penmanship, each \$1.00 per term. All necessary stationery, books and supplies may be obtained at the college.

Course of Study

FIRST YEAR

FALL TERM	WINTER TERM	SPRING TERM
Rapid Calculation 3	Rapid Calculation 3	Spelling 2
Spelling 2	Spelling 2	Commercial Geography or Farm Acc'ting....5
Grammar 5	Commercial Law 5	Letter Writing 5
Penmanship 5	Penmanship 5	Bookkeeping and Actual Business Practice ..15
Bookkeeping 15	Bookkeeping 15	Telegraphy 5
Telegraphy 5	Telegraphy 5	

SECOND YEAR

FALL TERM	WINTER TERM	SPRING TERM
Industrial History of the U. S. 5	Civics 5	Elementary Economics 5
Penmanship 5	Penmanship 5	Penmanship 5
Stenography 15	Stenography 15	Stenography 15
Spanish 5	Spanish 5	Spanish 5
Spelling 2	Spelling 2	Spelling 2

**Those wishing only one year of commercial work may select a course of one year having either bookkeeping or shorthand as the major, from the above two year course.*

Bookkeeping

The system we use requires the student to do his own work without the least dependence on any other student. All questions needing explanation are referred to the instructor in charge thus bringing the student into direct contact with the most thorough knowledge on the subject. The instructors are always ready and willing to help any student who needs it, particularly the backward one.

Our system teaches both the theory and practice of book-keeping. In our Introductory Department the student is taught the meaning and application of the terms used in business, and when he enters the Actual Business Department, he has no difficulty in putting them into practice.

Fifteen hours per week, throughout the school year.

Actual Business

The Actual Business Department is a miniature business world within itself, and is the best equipped department in the state. It is fitted up in regular counting house style with six offices and a bank. The offices are equipped with filing devices, loose-leaf ledgers, etc. The Bank has a Burroughs Adding Machine which all students taking bookkeeping are taught to manipulate and care for.

The lines of business followed in this department embrace Wholesaling, Retailing, Banking, Commission, etc. The work is carefully arranged. Each student on entering the department is supplied by the instructor in charge with college currency. He leases his store, deposits his money in the bank, buys and sells merchandise, draws checks, drafts, notes, and at the same time keeps his own books, which are made up entirely of transactions with other members of the department. The student first conducts his business as a single proprietor, then as a partnership. Thus he learns in a short time to do what it would take many months to learn by experience in every day business life.

At the close of the Actual Business work two students exchange and audit each other's books. This is a valuable drill as the field of the auditor is unlimited. These men always receive the highest salaries.

Ten hours per week during spring term.

Rapid Calculation

Rapid Calculation is a drill of great importance. Special attention is given to short practical methods. Accuracy and speed are insisted upon, and the training received in this class

is not only an important aid in bookkeeping, but quickens the intellect and induces energy and thoroughness in all the work.

Every student taking bookkeeping is required to take this subject, and those taking shorthand may do so.

Three hours per week during fall and winter terms.

Penmanship

Much attention is given to business writing, as a successful business career requires the ability to write a rapid, legible hand. The student is required to become proficient in order that his books may present a creditable appearance and that his letter writing shall be satisfactory. We use the style of business writing that is taught in the best business colleges in our country.

Instruction is given each student individually at the student's desk, as well as in class. A student is thus enabled to become a proficient business writer in a very short time.

People are awakening to the fact that good writing is essential, and many students from other departments manage to take an hour's instruction in this subject each day. All students taking bookkeeping or stenography are required to take business writing.

Those desiring to take advanced work in Ornamental Writing, or Engrossing may do so. Our aim is to make finished penmen of those taking this course.

Five hours per week.

STENOGRAPHY

A stenographic course that was satisfactory ten years ago will not meet the requirements today so exacting has become the business public. Our course has therefore been strengthened from time to time to meet this demand and our graduates are competent to satisfactorily fill any office position from the start.

Short and easy exercises are first given in this course followed gradually by longer practice from the simple business letters to more difficult matter. The student masters the various primary exercises thoroughly before proceeding with the ad-

vance work. Exercises are given in writing and reading shorthand and in transcribing from shorthand notes to long hand. A special course in dictation is arranged for the purpose of obtaining speed and to acquaint the student with the various heads of business, such as: Wood, Coal, Real Estate and Insurance, Wholesale and Retail Hardware, Dry Goods, Manufacturing, Loans, Collections, etc. A drill is given in law correspondence and forms of legal documents and is made up of material taken from actual work.

Exercises taken from dictation are transcribed on the typewriter and corrections made. The work is conducted in small classes and the student thus receives a large amount of personal attention.

The Gregg system of Shorthand is taught.

Ten hours per week, throughout the year.

Typewriting

A practical course in touch typewriting is taught. The work is arranged systematically, all work being handed to the instructor for correction. The course is laid out in budget form, each budget making a definite stage in the progress of the student toward his object—the complete mastery of the keyboard by the sense of touch. A complete equipment of standard typewriters is provided for the work in this department.

The department also has a Grammeter Multigraph which all students taking typewriting are instructed to use. This is a machine for duplicating typewriting and is rapidly being added to the equipment of modern offices having a large amount of circular letter work to do.

Five hours per week throughout the year.

Model Office

A Model Office has been fitted up with the most modern office equipment for the purpose of giving the shorthand students actual office practice.

In this office the students take dictation just as they will when in the employ of practical business men. Letter filing, billing and taking dictation from the Edison Business Phonograph are features of this office practice. This drill is of inestimable value to the stenographer.

Letter Writing

In this course we give the theory and practice of commercial correspondence.

Much attention is given to punctuation, capitalization, and paragraphing. This is a very important feature of the shorthand course, for it is essential that every stenographer shall be able to recognize and perhaps correct idiomatic expressions without hesitation, and arrange all modifying words, phrases and clauses in such manner that the reader may have no difficulty in understanding the writer's meaning.

Special attention is given to dictation, and the students are drilled in composing and forming letters on various subjects thus enabling them to become good letter writers. Equal attention is given the bookkeeping students who do not take stenography. The student not only learns the mechanical form, but is taught the tone that should characterize a well written letter.

Five hours per week, during the spring term.

Spelling

Correct spelling is rightly regarded as an indication of culture, and bad spelling as indicating the lack of it.

Spelling is made one of the most important subjects in our course; and all students are required to take it. The words used are selected with great care, two considerations being kept constantly in view: First, that the word is in common use; and second, that it is liable to be misspelled.

Four times a week during fall and winter terms.

Commercial Law

A knowledge of the elements of Commercial Law is of value to every one. Many have lost thousands of dollars through ignorance of the points covered by our course.

The purpose of the course is to give the student a knowledge of the fundamental principles of the law as applied to business relations. The subject is taken up in a non-technical way with as thorough study as time permits. The aim is to show the ways that lead from litigation rather than to make lawyers of our students. Contracts, Sales, Negotiable Instruments, Agency, Bailments, Partnership and Corporations receive attention. Cases are cited to show the interpretation of principles. While this course is required of all students in the commercial department, it is profitable study for anyone who in any way will be called upon to transact business. A collection of valuable reference books is accessible to students taking this subject.

Text: Gano's Commercial Law.

Five hours per week during winter term.

Commercial Geography

The course treats of the different commercial products found in the various markets, how and where produced, preparation for the market, how shipped and where sold. The location of the greatest industries will be studied to learn the cause and effect of manufacturing centers. The trade relations of the United States and the regulations employed will receive attention. Reference works and reports will be consulted and local conditions considered to make the work practical.

Five hours per week during spring term.

Farm Accounting

This is a short course in bookkeeping, made up of farm transactions. The student is taught the shortest and most simple way of keeping systematized accounts. The course is valuable to anyone, but more particularly to the farmer. It should be taken in connection with the Agricultural course.

Telegraphy

There having been such a demand for telegraphy, this course, was installed last year and was very popular from the first. Our equipment is of the best, and the teacher in charge has had a number of years experience.

A well equipped wireless station has been installed as a part of the apparatus.

DOMESTIC SCIENCE

The Domestic Science Department occupies the first floor of Burch Hall. The large laboratory kitchen, equipped with work tables, cabinets, ranges, sinks, refrigerator and kitchen utensils, accommodates a class of twenty-four students at one time. The demonstration dining room opens through a butler's pantry from the kitchen and is used by the classes in serving. There are two large sewing rooms equipped with sewing tables, tables for drafting, sewing machines, long mirrors, lockers and cabinets. A pleasing recitation room completes the department.

Two uniforms, each consisting of a cotton dress and princess apron, are required by each student in the Domestic Science Department. The dresses should be made one-piece, neat and simple. The uniforms must be worn in the kitchen.

The conviction is becoming more firmly established in the minds of educated people that Domestic Science is an art which requires study and training. A woman is expected to be able to train her children properly, to run her household affairs smoothly, to spend her husband's income wisely, and to make her house a place of harmony, beauty, convenience and inspiration. Domestic Science courses are planned to educate girls along these lines.

The following courses of study have been planned to provide a through training in the organization and administration of the affairs of the home through the application of scientific, economical and artistic principles.

Courses of Study

The qualifications for admission to the teachers' course consist of graduation from a four years' high school course, or some other equivalent preparation.

Foundation Teachers' Course

JUNIOR YEAR

FALL TERM	WINTER TERM	SPRING TERM
Model Sewing 4	Plain Sewing 4	Plain Sewing 4
Cooking 6	Cooking 6	Cooking 6
Millinery 4	Art Needlework 4	Millinery 4
General Chemistry 5	General Chemistry 5	General Chemistry 5
Physiology 5	Physiology 5	Food Study 5
Psychology 5	Food Study II.	Education 5
	Psychology 5	
SENIOR YEAR		
Dressmaking 4	Dressmaking 4	Dressmaking 4
Cooking 6	Cooking 6	Cooking 4
Dietetics 5	Dietetics II. Bacteriology 5	Bacteriology 5
Household Management4	Household Management4	Home Nursing 5
Organic Chemistry 5	Food Chemistry 5	Food Chemistry 5
Elective 5	Elective 5	Elective 5

Homemakers Courses

I. Regular two-year course.

This course is planned to meet the demand of any girl who may desire to better equip herself for the responsibilities of home life. Girls who have had some high school training, but who do not hold high school diplomas, and girls who have only a rural school education, may take this work. Its purpose is to secure practical efficiency in regard to the proper administration of the affairs in the home.

Course of Study

FALL TERM	JUNIOR YEAR WINTER TERM	SPRING TERM
Plain Sewing 4	Plain Sewing 4	Plain Sewing 4
Cooking 6	Cooking 6	Cooking 6
Millinery 4	Art Needlework 4	Millinery 4
Rhetoric 5	Rhetoric 5	Rhetoric 5
Model Sewing 4	Physiology 5	Home Nursing
SENIOR YEAR		
Dressmaking 4	Dressmaking 4	Dressmaking 4
Cooking 6	Cooking 6	Cooking 6
Food study 5	Food Study II	Dietetics 5
Household Manag.....4	Dietetics 5	Textiles 4
	Household Manag. 4	

II. Homemakers' Short Course.

The object of this course is to afford an opportunity to those girls who desire a scientific training in home economics and who can leave the home only during the winter months. Any girl desiring to take the course may do so.

This course can be completed in two winter terms of four months each. A diploma for the completion of the course is given at the regular commencement exercises in June.

Course of Study

JUNIOR YEAR	SENIOR YEAR
Plain Sewing 6	Dressmaking 6
Cooking 6	Cooking 6
Art needlework 4	Home Nursing 4
Physiology 5	Household Manag.....4

Girls who are capable and who desire to take other subjects besides those named in the course, may be allowed to do so providing such an arrangement does not interfere with the regular schedule.

Description of Courses

A few short descriptions of the subjects offered in the Domestic Science course are given below, so that prospective students may obtain some idea of what kind of work is required in the various classes. In the Teachers' Course additional work along professional lines, is given.

Model Sewing

The aims of the course are:

I. To teach the fundamental principles involved in hand sewing.

II. To help the student to form correct methods of work.

III. To develop neatness, accuracy and skill.

A brief outline of the course follows:

STITCHES—basting, running, stitching, combination cross, overcasting.

HEMS—folding, basting, hemming, turning corners.

BANDS AND RUFFLES.

PATCHING—Hemmed overhanded, cut-stitched.

DARNING—Stockinet, cloth, both plain and figured.

WORK ON FLANNEL—Seams, hems, decorative stitches.

DAMASK—French hem, hemstitching, fringe.

PLACKETS—Hemmed, bound, bound and faced.

FASTENINGS—Button holes, hooks and eyes, eyelets, tape.

TRIMMINGS—Tucks, ruffles, setting in of lace and embroidery.

Plain Sewing

The Snow System of Drafting is used and may be purchased from the instructor by each student for \$3.50, which sum covers the cost of the Snow System and the sewing fee.

The same aims are observed in Plain Sewing as in Model Sewing. The work required in this course includes the drafting and making of the following garments:

- | | |
|------------------|------------------|
| 1. Corset Cover. | 4. Petticoat. |
| 2. Drawers. | 5. Cotton Dress. |
| 3. Nightgown. | 6. Thin Dress. |

Dressmaking

Dressmaking is an advanced course in drafting and garment making for students having had the model and plain sewing. The object of this course is to establish the fundamental principles of plain sewing and to develop skill and originality in both the designing and making of clothes.

Commercial patterns are studied so that students may use them intelligently. The patterns are measured, tested and altered to suit the needs of particular individuals.

Instruction relative to the selection of material is given, special emphasis being placed on economy, suitability and durability. A study of good lines in relation to the individual form is a special feature of the work. The place of various garments in the wardrobe is also discussed.

Each student must furnish her own material. The following garments are made: Tailored waist, wool shirt-waist suit, fancy silk waist and party dress.

In the Teachers' Course the practical work is supplemented by the theoretical and professional phases of the work. Problems apt to confront prospective teachers are discussed. Suggestions are given in regard to methods and manner of presenting subject matter to public school classes.

Art Needlework

The aims of the course in Art Needlework are:

- I. To develop taste, skill, neatness and accuracy in work.
- II. To give essentials of good design as applied to Art Needlework.
- III. To apply this knowledge to useful articles, either house furnishing or clothing.

In the Teachers' Course suggestions are given in regard to the adaptation of this work to the needs of public school classes.

The work required in this course includes crocheting, knitting, ornamental darning, applique, cross-stitch, hem stitching, Swedish weaving, scallops, initials, French embroidery and eye-lets. Each student must furnish her own materials.

The designing, making and trimming of a fall and spring hat, the purpose of which is to develop artistic ability, skill and originality, as well as to emphasize the practical side is required.

The course, briefly outlined, is as follows:

Work with buckram—bandeau, buckles, cabachons, foundation work, practice frames, plaits and folds.

Bow making—tissue paper and velvet bows, rosettes.

Fall hat—designing, shaping, wiring, covering, trimming, lining.

Flower making—roses, American beauty, wild, tea; violets.

Work with wire—practice frame.

Spring hat—wire frame, covering with straw, lace or chiffon, trimming, lining.

Study of Tinting and renovating—selection and use of colors, dyeing and cleaning.

Household Management

This subject is a study of the home in all its phases. It is designed to give the student a practical knowledge of the problems concerned with the administration of household affairs.

The course covers the following subjects:

I. House sanitation—including location, site, drainage, disposal of waste, pure water supply, ventilation, heating, lighting and plumbing.

II. House Finishes and Furnishings—including the study of house plans, decoration, finishes and coverings for floors, walls and wood-work, furniture adapted to different kinds of rooms, curtains, draperies, etc. Each phase is studied with respect to suitability and economy.

III. Household Administration—includes a study of the business management of the home. This subject covers the proper division of the income, keeping of household accounts, organization of the work in the home, the servant problem, and entertainment. Other special problems of the household are discussed here also.

Food Study

A study is made of food principles and of food materials as found on the market with regard to their production or manufacture, physical characteristics, seasonableness, cost, adulteration, chemical composition, nutritive and dietetic values, preparation, proper combinations with other foods and physiological effects.

The following subjects are covered in the course:

1. The cell.
2. The process of metabolism.
3. Study of food principles.
4. Outline for study of food materials.
5. Food products, such as typical starches, cereals, vegetables, fruits, nuts, condiments, spices, flavorings, beverages, milk, eggs, meats, poultry and fish.
6. Pure food laws.
7. Food inspection.

Cookery

This course is designed to meet the requirements of those planning to become teachers of Domestic Science, as well as those planning to become Homemakers. Foods are studied and tested so that the effect of heat and moisture upon them may be learned. The principles of cookery are thus determined and are applied to the preparation of simple foods and to combinations of foods. It is not the object of the course to cover the whole field of cookery, but rather to give to the student a thorough understanding of the theory and method involved in the cooking of the more fundamental foods. The various processes are repeated often enough so that a fair degree of skill in manipulation of both materials and utensils is attained. Attention is given to the systematic organization of the home and school kitchens and their management. The cost of food is studied in relation to the income of the home or school and the cost of lessons is worked out to serve as a basis for comparison. The students taking the teachers' course are trained not only to obtain good results in housekeeping and cookery but also to think and work with a view to presenting the subject to others.

Suggestions as to the adaptation of lessons to public school work are given.

The following is a brief outline of the course:

1. Simple carbohydrate foods.
2. The cookery of vegetables.
3. Study of batters and doughs.
4. Study of yeasts.
5. Preparation and use of dried fruits.
6. Principles involved in making of pastry.
7. Selection and cookery of meats.
8. Cookery of protein foods, such as fish, oysters, poultry, eggs, milk.
9. Making of butter and cheese.
10. Simple desserts.
11. Beverages.

12. Review of batters and doughs.
13. Salads and Dressings.
14. Frozen Desserts.
15. Canning and Preserving.
16. Planning and serving of meals.
17. Lessons for grade work.
18. Invalid cookery.

Advanced Cookery

This course is planned to meet the needs of the advanced students, who wish to supplement the work given in Junior cookery and in that way broaden their knowledge. The course is also arranged for experienced housekeepers, who wish to obtain a more scientific basis for their work.

Practical work in cookery is given. The principles of cookery and methods of combination are reviewed and applied. A special effort is made to secure ease of manipulation. Such topics as marketing, preservation of foods, preparing of food for the table, making of menus, table service, demonstrations, and large quantity cookery are given much attention.

Home Nursing

The aim of this course is to give a practical knowledge of the principles of nursing and an application of these principles to conditions in the home, in caring for some of the simpler forms of common diseases; also to give efficient aid in emergencies which might arise in the home or school.

The course includes:

1. Destruction of bacteria.
2. The sick room.
3. Care of patient.
4. Common symptoms and their significance.
5. Baths and their purposes.
6. Counter-irritants and other local applications.
7. Medicines and foods.
8. Contagious and infectious diseases.
9. Emergencies.
10. Bandages and bandaging.

Textiles

This course has been planned to give the girl a broader understanding of the textile market and to aid her in the selection and use of textile fabrics. The following phases of the subject are dealt with:

- I. History of the textile industries.
 - (1) Spinning. (2) Weaving.
- II. Classification of textile fibers.
 - (1) Sources—vegetable, animal, mineral, artificial.
- III. Detailed study of the leading textile fibers.
 - (1) Cotton. (2) Flax. (3) Silk, (4) Wool.
- IV. Knowledge of Fabrics.
 - (1) Names. (2) Prices. (3) Widths.
- V. Chemistry of Textiles.
 - (1) Adulteration—reasons for, physical and chemical tests, (2) dyeing. (3) laundering. (4) cleaning.
- VI. Special phases of the Subject.
 - (1) Economic. (2) Social.

Dietetics

The purposes of the course in Dietetics are (1) to study the principles of human nutrition, giving special attention to food requirements and nutritive values, (2) and to apply this knowledge to practical feeding problems of individuals of various occupations, and of groups of individuals.

The first aim is accomplished in recitation work. Sherman's "Chemistry of Food and Nutrition" is used as a text for the largest part of the work. The second aim is accomplished by laboratory work. In the laboratory, the fuel values of foods are calculated and tabulated; dietaries are planned to meet various conditions as to requirements and cost and these are cooked. In this way the student is able to compare the actual and the theoretical meal. Menus are planned for the diseases of nutrition and these are prepared in the laboratory and their food value determined.

The principles underlying infant feeding are studied and some practice in the preparation and modification of milk is given.

For description of the courses in Physiology, Bacteriology, Chemistry, English, Psychology, Education, and the elective studies of the Domestic Science courses see the courses as described under the general departments.

DRAWING

The mechanical and free hand drawing room is well lighted and supplied with the necessary tables and drawing boards.

I. Freehand

This course includes lettering, the sketching of geometric forms, and working sketches of parts of machines. Particular attention is given to accuracy in outlines and details and the elements of perspective.

II. Mechanical

Conventional methods, standard sizes and shapes of bolts, hexagonal and square nuts, etc., and machine and structural details, together with the elements of isometric and oblique projections.

First year, 170 hours.

III. Mechanical

Design and details of the more important parts of stationary engines, traction engines, boiler settings, etc.

Second year.

IV. Descriptive Geometry

(a) Problems relating to points, lines, solids, interpenetrations, surfaces of revolution, developments, etc.

Recitations and Lectures

(b) Orthology, isometric, horizontal, oblique and perspective projections, shades and shadows including line shading and brush tinting.

Second year, 79 hours.

V. Carpentry and Building

Simple and oblique projection applied to construction of wood; plan and elevation of buildings; framing plans of roof; trusses; floor plans; layout of mills and location of machinery; details of open and boxed cornices, gutters, window and door frames for frame and brick buildings; interior trim; details of cabinet work, mantels and wainscoating; development of rake and level moldings, cornices, brackets and groins; circular head over recess and splayed jambs; problems in stair building and handrail enlargement; tracing; blueprinting; free-hand perspective drawing.

Drafting entire plans for dwelling, stores, and apartment houses, including floor plans, elevations, and plumbing plans for heating, gas, ventilation, sewage, water supply, etc.

VI. Bricklaying and Plastering

Detail drawings of chimneys, arches, cornices, etc; plans elevations, and sections of houses, flat buildings, and other structures.

EDUCATION

a. Elementary Pedagogy

An elective for those who are preparing to teach in the common schools. The underlying principles of good school practice are studied with the view of giving the young teacher some knowledge of the theory of good school teaching. A standard elementary text is used as the basis of this course.

Spring term, five hours per week.

I. Psychology

A course in the fundamentals of this subject, considering the logical growth of the mind and the principles of child study. The course is given with a view to practical use by those who are planning to teach, and is required of those taking the Teachers' Course in Domestic Science.

Five hours per week, for a half year.

II. Principles of Education

A course in the principles of class management, the aims of instruction, the classification and conduct of a school, the nature of the teaching process and the relation of the teacher to the school and community. The course aims to lay a practical foundation for actual teaching. With Course I it makes a full year course with ten semester hours of credit.

Five hours per week for a half year.

ENGINEERING

The courses in engineering are divided into three groups,—first, a general secondary, in which a one, two and three-year secondary engineering course are offered; second, the electrical courses, which are three in number—a two year electrical and a one year electrical based on a high school preparation, and a three winter term short course in electrical engineering; and third, the mechanical courses, three in number, corresponding to those in electrical engineering.

The one, two and three year secondary courses in general engineering are adapted for those students who have had only an eighth grade preparation. The courses are outlined in such a manner that the one year course is the first year of the two year course, and the two year course comprises the first and second years' work of the three year course.

COURSES**A One Year Course In Engineering, Requiring an Eighth Grade Preparation**

FALL TERM	WINTER TERM	SPRING TERM
Algebra	Algebra	Algebra
Rhetoric	Rhetoric	Rhetoric
Physics (a) Lab.	Civics.	Physics (a) (Lab.)
Mechanical Drawing I.	Physics (a) Lab.	Practical Electricity
Wood Shop	Mechanical Drawing II	Mechanical Drawing
	Forge Shop.	Machine Shop

This course should fit graduates for such positions as train electrician, or operator of small electric light or gas-driven pumping plants, etc.

A Two Year Course in Engineering

FIRST YEAR: Same as one year course.

SECOND YEAR

Plane Geometry	Plane Geometry	Solid Geometry
Industrial History	Chemistry	Economics
D. C. Engineering (Lab.)	D. C. Eng. (Lab.)	Mechanisms
Engineering Drawing	Industrial Oppor.	Eng. Contracts and
Pattern Making	Engineering Drawing	Estimating
	Foundry	Engineering Drawing
	Steam and Gas Engines	Mech. Eng. Lab.

This course should fit a graduate to qualify as a draftsman in engineering drafting departments, or as a special apprentice in almost any industrial field, in addition to suggested positions for the one year course.

A Three Year Course in Engineering

FIRST YEAR: Same as one year course.

SECOND YEAR: Same as two year course.

THIRD YEAR

Trigonometry	Plane Surveying	Plane Surveying
English Masterpieces	English Masterpieces	English Masterpieces
A. C. Eng. (Lab.)	Mech. Eng. Lab.	Cement Testing
Machine Design	Estimating Building	Electrical Design V.
Machine Shop	Materials	Machine Shop
	Machine Design	
	Machine Shop	

Graduates of this course should be fitted to serve as assistant superintendents of industrial concerns, special apprentices, as estimator for contractors, in addition to suggested positions for one and two year courses.

ELECTRICAL ENGINEERING

Three courses are offered in this department. The first is the two year Electrical Engineering Course. This consists of two years' work in English, mathematics, physics, chemistry, shop work, drawing and surveying. A high school course or its equivalent is required for admission to this course. The second consists of a one year course based on a high school preparation.

The third line of work is an elementary Electrical Engineering Course which may be completed in 48 weeks. Thus one may finish this work in three winter terms. The work includes short, practical courses in electrical engineering with mechanical drawing, shop work, physics, chemistry, algebra, geometry, and English. For admission in this course, a knowledge of high school algebra and physics is very desirable. The work in electrical engineering will also be given in the fall and spring terms if there is sufficient call for it. Telephony, the operation and testing of motors and generators, electric lighting and power transmission, electric railways, and electric installation will receive considerable attention.

The object of these short courses is to prepare men to install and operate electric machinery and appliances. There is good demand for men in telephone work, in the operation of power plants, the installation of electrical machinery, and in the electrical manufacturing industries.

The Electrical Engineering laboratory has been fitted up but recently, but it offers excellent facilities for doing the regular direct current engineering experiments and the elementary alternating current experiments and tests. The 220 volt three phase alternating current is taken from the city circuit into the laboratory. Here it is fed into the induction motor and a synchronous motor. These are used for making tests and for running the various series, shunt and compound, and A. C. generators. An I.K. W. compound D. C. generator furnishes current for running the series, shunt and compound motors and for exciting the alternator field and also for making laboratory tests. Direct current and alternating current, both single phase and polyphase, are on tap at the general switchboard. Here all the machines, water rheostats, the lamp bank are connected, while the I. K. W. generator is connected to a marble panel switchboard with its own meters, switches, circuit breaker, field rheostat, etc. The school has a full line of meters, tachometers, speed indicators, rheostats, circuit breakers, prony brakes, etc. The Telephone Department has secured a number of different types of series and bridging telephones.

A complete Wireless Telegraph outfit has been added to the laboratory equipment for those who wish to give attention to this new science.

A Two Year Course in Electrical Engineering, Assuming a High

School Education

First Year

FALL TERM	WINTER TERM	SPRING TERM
Plane Trigonometry	Algebra	Algebra
English	English	English
Physics (Lab.)	Physics (Lab.)	Physics (Lab.)
Chemistry (Lab.)	Chemistry (Lab.)	Chemistry (Lab.)
Wood Shop	Foundry	Forge Work
Mechanical Drawing	Mechanical Drawing	Mechanical Drawing

Second Year

Analytics	Calculus	Calculus
Industrial History	Steam and Gas Engines	Mechanism & Mechanics
Strength of Materials	and Boilers	Economics
D. C. (Lab.)	A. C. (Lab.)	Applied Electricity
Elect. Drawing	Industrial Oppor.	(R. R. Storage, Bat-
Machine Shop	Elect. Drawing	teries-Tel. etc.)
Elect. Eng.	Pract. Elect. Wiring	Elect. Drawing
		Practical Elect. Work

A graduate of this course should be able to act as a foreman or general superintendent of an electric light plant in a town of 2,000 or less, or to fill at once the position of engineering apprentice, tester, salesman, inspector, electrical draftsman, and a variety of similar positions.

A One Year Course in Electrical Engineering, Assuming a High School Preparation

FALL TERM	WINTER TERM	SPRING TERM
Trigonometry	College Algebra	College Algebra
English	English	English
Physics with Lab.	Physics (Lab.)	Economics
Elect. Eng.	Elect. Eng.	Applied Electricity
D. C. (Lab.)	A. C. (Lab.)	(Wiring, telephones
Wood Shop	Foundry and Forge	and Telegraph.)
Mechanical Drawing	Elect. Drawing	Machine Shop
		Elect. Drawing

A graduate of this course should be able to secure a position with an electric company testing meters, wiring or as plant operator. He should also be able to construct telephone lines, properly install telephone instruments, etc. Or he should be able to secure a position as electrical apprentice or tester.

Three Year Winter Term Course in Elementary Engineering

Courses in Electrical Engineering:

FIRST YEAR	WINTER TERMS SECOND YEAR	THIRD YEAR
Arithmetic and Elementary Algebra 5	Algebra 5	Geometry 5
English Grammar 4	Rhetoric 4	Civics 5
Drawing I.....5	Drawing II.....5	Elect. Design E. E. V..5
Electrical Measure	Direct Current Engineering E. E. H. 5	Alternating Current Engineering E. E. III..5
E. E. I.....5	Physics (c) 5	Telephone Engineering
Shopwork in Iron....6		E. E. IV.....5
		Chemistry 5

NOTE—Additional work in shopwork and engineering may be taken by those who have completed any of the above subjects.

I. Electrical Measurements

This course is designed to familiarize the student with the voltaic cell, simple electrical circuits, and the units used in electrical engineering work. The work will be about equally divided between the laboratory and recitation rooms.

Winter term, five hours.

II. Direct Current Machinery

Theory of magnetic circuit. Fundamental principles of motors, generators, and other direct current apparatus and machinery. Systems of distribution, losses, efficiencies, electric lighting and storage batteries.

Recitations, lectures, and laboratory work.

Fall or winter terms, five hours per week.

III. Alternating Current Machinery

This is an elementary course in the generation, transformation, and utilization of alternating electric currents.

Winter term, five hours per week.

IV. Telephony

The construction and operation of the different parts of the telephone. Series and bridging systems. Central station installation, and operation. Line construction, batteries, protective devices. Telephone troubles and their remedies.

Laboratory work accompanies this course.

Winter term, five hours per week.

V. Electrical Design

In this course the work in mechanical drawing as outlined under Drawing II is continued, with special reference to the design and details of electrical machinery.

During the later part of this course the student draws the plans, and makes all calculations, including cost data, for the installation of an electric plant on a farm or in a town.

MECHANICAL ENGINEERING

The mechanical department is located in the mechanical building. This building is constructed of concrete blocks, is one story high, neat in appearance and conveniently arranged and situated. In it are located the engine laboratories, machine, wood, trade and forge shop.

The engineering laboratory is provided with several types of engines both throttling and automatic, and for the work in traction engineering two engines are provided.

Several makes of gasoline engines are available. The laboratory work will include tests on different types of engines to determine power developed, economy of operation, etc. All necessary gauges, indicators, and other instruments of precision will be provided.

For the study of the strength of materials, a 50,000 lb. tension and compression machine is provided, and for transverse testing of beams, bars, etc., a suitable machine will be furnished.

In the general library will be found the leading technical papers and magazines.

In this department three courses are now offered. The one and two year courses are based upon a high school preparation or its equivalent.

One Year Course

FALL TERM
 Trigonometry
 Physics (Mech. & Heat)
 Industrial History
 Mechanism
 Eng. Drawing
 Joinery

WINTER TERM
 Advanced Algebra
 Physics (Elec. & Mag.)
 Contracts and Spec.
 Mechanism
 Eng. Drawing
 Forge Work

SPRING TERM
 Advanced Algebra
 Qual. Analysis
 Political Economy
 Mach. Design
 Eng. Drawing
 Mach. Work

Two Year Course

First year same as above. Students may then go on and take up second year and thus complete a two year course should they desire to do so after having taken the one year course.

FALL TERM	WINTER TERM	SPRING TERM
Analytics	Calculus	Calculus
Fuel Analysis	Gas Engines	Steam Eng. and Boilers
Mech. Lab.	Mech. Lab.	Elec. Lab. (D. C. work)
Cements and Concrete	Cement Lab.	Surveying
Eng. Drawing	Eng. Drawing	Eng. Drawing
Pattern Making	Foundry Practice	Machine Const.

The one year course should fit a graduate for successfully filling such positions as draughtsmen, special apprentices in any line of manufacturing or construction work, etc.

The two year course should fit for assistant superintendents of manufacturing concerns or superintendents of electric light, water systems, assistant engineers for contractors, etc. Excellent training for contractors themselves.

Three Year Course in Elementary Steam Engineering

For the benefit of a large class of students, who would find it utterly impossible for them to leave their work in the early fall and who also feel it necessary for them to drop school work and return to their work on the farm or elsewhere with the coming of spring, there has been arranged a short course in Elementary Steam Engineering which shall run during the winter term only and shall require three years for completion.

With this end in view the winter term has been made as long as seems practical and still keep it in such limits as will best accommodate this class of students. The term begins on the first Tuesday after Thanksgiving and closes on the last Friday in March, and it is urged that all students who contemplate taking this course shall endeavor to be present for the opening day and to stay to the end of the term.

In order to make this course successful and of benefit to students taking it, it is necessary to crowd a large amount of work into a short time. It is of necessity a very heavy course and requires constant and diligent application and attention to work on the part of the student. Upon the satisfactory completion of the full course the student will be awarded a diploma.

Requirements for Admission

The students desiring to take this course must present evidence of his ability to do the work required successfully. If the candidate be a young man he should at least have completed his common school work and be prepared to enter any well established high school. Persons of more mature years will be permitted to enter with perhaps less preparation in the hope that their better judgment and more diligent application will enable them to successfully carry on the work.

The fees for this course are the same as for the regular engineering course.

Course of Study

This course is given during the winter term only.

FIRST YEAR	SECOND YEAR	THIRD YEAR
Arithmetic and Elementary Algebra ...5	Algebra 5	Geometry 5
English Grammar 4	English Composition..4	Civil Government ...5
Drawing (I) 5	Physics (c) 5	Mechanical Drawing (III) 3
Chemistry (b) 5	Steam and Gas Engines 5	Mechanical Laboratory Physics (b) 5
Shopwork (I) 6	Mechanical Drawing (II) 5	Shopwork (III) 5
	Shopwork (II) 6	

ENGLISH LANGUAGE AND LITERATURE

It is the aim of the Department of English to train students to read, write and speak effectively. It must be understood then without further notice that some training in English Composition and in Vocal Delivery will be given in every course offered by the Department.

English Grammar

A thorough study of theoretical and applied grammar as a review and as a foundation for later English study, with attention to the correct forms of oral and written expression.

Five hours per week during the year.

a. Rhetoric and Composition

For this course a thorough knowledge of English Grammar is a prerequisite. The aim of this course is to acquaint the student with the elements of rhetoric, to enable him to express his thoughts clearly and to develop his appreciation of good literature. This is attained by the study of a text-book, the critical study of numerous selections from the best authors, and frequent compositions.

Five hours per week during the year.

a. (2) English Composition

This is a course in the principles of composition and rhetoric, and is intended to cover some of the essential points in course (a) but in much less detail. Some classics are studied as time permits, and considerable attention is given to proper forms of expression and good usage. The course is required of students taking the short courses offered in several departments.

The first half-year will be devoted to a study of the principles governing good reading. Two plays of Shakespeare will be studied also Coleridge's *Ancient Mariner* and Elliot's *Silas Marner*. The second half-year will be devoted to a study of the *History of American Literature*, and of selections from the works of prominent American authors.

Five hours per week during the year.

b. History of English Literature

In this course the Literary History of England will be carefully studied. Careful attention will be given also to certain of the masterpieces of English Literature. Special attention will be given to Shakespeare, Milton, Coleridge, Burns, Carlyle and Tennyson. The study of the works of such writers will furnish material for practice in composition.

Five hours per week during the year.

I. Advanced Rhetoric and Literary Criticism

This course aims primarily to cultivate, along practical lines, an effective use of the English language both in writing and speaking. It is intended furthermore to present by a series of lectures and discussions the relation of literature to the life and work of the average man.

OUTLINE OF WORK:

Fall Term—Hill's Principles of Rhetoric, Lectures, Recitations, Practice in Speaking and Writing.

Winter Term—Work of Fall Term continued. Text: Phillips' Effective Speaking.

Spring Term—Previous work continued, also Lectures and Recitations or Literary Criticism.

Four hours per week during the year.

II. Argumentation and Debate

This course presupposes and continues Course I. It involves further study of the principles underlying the planning and delivery of an effective speech. One period each week will be given to formal debate. Attention will be given to Literary Criticism and will centralize on an intensive study (1) of several of Shakespeare's plays, and (2) of various selections from Shakespeare which best illustrate the principles of Argumentation.

Five hours per week during the year.

HISTORY AND POLITICAL SCIENCE

A large number of reference works are available to supplement the class manuals in the following courses. An effort is made to give the student a view of the subjects from the standpoint of the times in which the event occurred.

a. Civics

The course is given by text-books, lectures and reference reading. It will include a thorough study of the organization and function of various departments, legislative, executive and

judicial, as they pertain to local, state and national government. The aim is to give the student an intelligent understanding of the government under which he lives.

Winter term, five hours per week.

b. Elementary Economics

This is an elementary course, giving a general survey of the entire field of economics. Attention will be given to the underlying principles of the science as an introduction to advanced courses, or as a part of a general education. Assigned readings on current economic questions will supplement the text. On demand a college course may be given in this subject.

Spring term, five hours per week.

c. Ancient History

This course presents a general survey of the history of the ancient world, both as a basis of historical knowledge, and as an introduction to the scientific method of historical study. The history of Greece and Rome will receive special emphasis.

Text: Myer's Ancient History.

Four hours a week for a year.

d. United States History, Review

A library and reading course in American history affording a rapid review to those who have completed the history of the graded school. Offered only on demand of a sufficient number to justify the organization of a class.

Five hours a week for two terms.

e. Industrial History of the United States

This course will trace the development of industries, commerce and transportation in the United States. The life of the people and their activities in securing a living and in building up the material greatness of the country will be considered, with special emphasis on conditions in the twentieth century. The work will be based upon a standard text, and may be taken by

students of advanced secondary standing, or by those in the vocational courses of higher grade. The student should be well grounded in United States history and civil government.

Fall term, four hours per week.

I. Mediaveal and Modern History

(1) History of the Middle Ages. This course is a study of European life and conditions from the eighth to the fifteenth centuries. The work of the great civilizing agencies and the developing life of the times are emphasized in order to understand the influences which contributed to the formation of the states of modern Europe.

Four hours per week for the first half year.

(2) Modern History. A study of European history since 1500. The social, political and industrial life of the people, and how these factors have contributed to the greatness of modern nations are studied. The great questions of international policies and relations receive attention.

This course may be taken separately, or with the preceding course to make a full year's credit.

Four hours per week for the second half year.

II. English and American History

The course will alternate with Course I.

(1). English History. The history of England from early times to the reign of George V. Special attention will be given to the life of the people, and to the vocational and industrial phases of the national life. The expansion of England and the development of liberal government and industrial autonomy in her colonies will be considered.

Four hours per week for a half year.

(2) American History. The last half of the year will be devoted to a study of the development of institutions in America with special emphasis upon the economic and industrial phases of American life. Some periods of the history will be studied quite critically, and the work will be adapted to the needs and

wishes of the class. The method will be by manual and library references.

Four hours per week for the second half year.

(This course was given in 1913-14).

Prerequisites to Courses I and II; Courses a, c, and d, or equivalents.

III. Political Science

An introductory course which will deal with both the principles of government and with the privileges and rights of the individual under the various relations he maintains with the community. The political, property and personal rights of the citizen in relation to his local government will receive consideration. This will be very largely a lecture and reading course, and the pupil should be well prepared in elementary civics and history.

Fall term, four hours per week.

IV. Industrial Opportunities

The purpose of this course is to acquaint the student with the possibilities and prospects offered in the different fields of industrial and vocational activities. The historical methods, and development of many industries with their organization and the possibilities and prospects presented by these activities as ways of making a living will be considered. This will be an advisory course given in part by lectures from representative men, and in part by assigned reading and occasional reports. It will be especially interesting to students in the vocational subjects.

Winter term, two hours credit.

V. Sociology

An elementary course in the study of society designed to furnish a scientific method of studying conditions and activities and also to show the application of principles already learned to man's relations to his fellows in social and business life.

Spring term, four hours per week.

LATIN**Course a**

Latin lessons and reading of prose. Caesar. Five hours per week during the year.

Course b

Fall term—Caesar's Gallic Wars.

Winter term—Caesar's Gallic Wars, completed.

Spring term—Cicero's Orations.

Course c

Fall term—Cicero's Orations.

Winter term—Vergil's Aeneid.

Spring term—Vergil's Aeneid.

Course I.

Fall term—Livy, Selection from Books I, XXI, XXII, with review of syntax.

Winter term—Latin Literature and Latin Prose, based on Machail's Latin Literature.

Spring term—Cicero, De Senectute, and Amicitia.

LIBRARY ECONOMY

The short course in library economy is designed to help the general student and reader in the most efficient use of any library. Special attention will be given to reference work. Care and selection of books will also be considered.

Winter term, two hours per week.

If desired, this course will be lengthened for a limited number of students. Practical work will be given in accessioning, cataloguing, classification and reference work, using the school library as a laboratory.

Four hours per week, during the year.

MATHEMATICS

The work in this department will be given with a view to its direct applied use both in subsequent mathematical courses, as

well as in physics and engineering. For this reason principles and operations will receive primary attention, special stress being laid upon those used the most frequently. Much time will be devoted to their application through many simple problems, similar to those which will arise in the future, while the study of the long complicated puzzle problem will be discouraged. In the earlier course each symbol and operation is, as far as possible, brought before the pupil only after its need has been demonstrated. The laboratory method is brought into play as far as possible, making the student do the work he really needs the most.

a. Academic Algebra

The first year's work is a study of elementary algebra through quadratic equations. The chief aim will be the acquiring a mastery of algebraic methods, with special emphasis upon the four fundamental operations and factoring. The solution, interpretation and application to practical problems of the algebraic equation is made the basis. Radicals, theory of exponents, etc., are studied as needed and with a view to their future use.

Five hours per week through the year.

Text: Milne's Academic Algebra.

Prerequisite: Arithmetic.

b. Plane and Solid Geometry

A thorough study of both plane and solid geometry.

Continuity of thought will be considered at all times, but chief attention will be given to those theorems which will be the most serviceable. These will be applied to numerous simple problems and to a few more difficult ones, in a way to illustrate their use.

Five hours per week through the year.

Text: Wentworth.

Prerequisite: Math (a).

c. Engineering Short Course

The work in mathematics for the engineering short course will begin with Arithmetic and Algebra the first year. The most fundamental principles of Arithmetic are first reviewed, after which an introduction to algebra is taken up. This will include a study of the language of Algebra together with the use of its various signs and symbols.

In the second year Algebra is continued through simultaneous linear equations. The main topic of this course will be the equation; its use and interpretation. It will be studied from the graphic as well as from the analytic standpoint. Its use in showing and explaining different mathematical and physical laws and formulas will be taken up as well as its use in solution of problems.

A short course in the elements of plane geometry and mensuration will be given the third year. The work must of necessity be taken up more briefly than in (b). Constructions and the solution of numerical problems will also receive a more prominent part.

Five hours per week through the three years of the Engineering Short Course.

Texts: Milne's Standard Arithmetic, Milne's Algebra, Wentworth's Geometry.

I. Trigonometry

The object of this course is a mastery of the solution of the triangle, its application to surveying and physics, and the gaining of a facility in the handling of logarithms. The necessary working formulae, solution of equations, etc., are studied carefully. Graphic solutions, drawn to scale, are considered in the early part of the course. Many formulae are also solved graphically.

Text: Murray.

Prerequisite: Math. (b).

Five hours per week, first semester.

II. College Algebra

A hasty review of the principles learned in (a) is first made. The course is then continued through college algebra. Such subjects as variations, maxima and minima are studied with graphic illustrations. Indeterminate forms, limits, etc., afford a natural means for an introduction to the elements of the calculus.

Text: Hall and Knight.

Prerequisite: Math. (b), but (1) is preferred.

Five hours per week, second semester.

III. Analytical Geometry

This is an elementary course in plane analytic geometry. Curves are carefully plotted and the relation between the curve and its equation are thoroughly studied. Much attention is given to conic sections.

Text: Smith and Gale's Introduction to Analytic Geometry.

Prerequisite: Math. I and II.

Five hours a week, first semester.

IV. Calculus

This branch of mathematics is being used more and more in physics and engineering. Alternating current phenomena are much better understood by one who has a working knowledge of calculus. Many problems that are solved with difficulty by the elementary mathematics are readily solved by the aid of calculus. Practical problems are continually introduced and the student soon learns to appreciate the value of this important instrument of mathematics.

Text: Osborne.

Prerequisite: Math. I, II, and III.

Five hours a week, winter and spring terms.

V. Surveying

Problems of dividing land, measuring land, and laying out curves are studied. Field work is given along these lines.

Drainage work receives considerable attention. The student is given practice with both the transit and level.

Spring term, five hours a week.

Prerequisite: Math I.

MODERN LANGUAGE

I. Elementary German

The course aims at a thorough introduction to the study of German language and literature. The Direct Method is used, emphasis being placed on conversation.

Texts: Mosher and Jenney, *Lern und Lesebuch*, Holzwarths "Grutz aus Deutschland".

Five hours per week during the year.

II. Composition and Literature

The course is a direct continuation of German I. By its completion the student should have mastered those principles of German composition which constitute the foundation of the study of the German language, and should be able to read at sight the modern German of everyday use.

Prerequisite, German I.

Texts: Bacon's *Composition*. Wildenbruch's *Das Edle Blut*, Heyse's *L'Arrabiata*, Storm's *Pole Poppenspaeler*.

NOTE—These reading texts cited are simply illustrative. The choice will depend upon previous reading done by different members of the class.

Five hours per week during the year.

III. Advanced German

This course is divided into a two hour and a three course course.

The three hour course consists of reading from the classic and modern writers. German is spoken as much as possible. Suggested texts: Schiller's *Wilhelm Tell*, Maria Stuart, *Die Jungfrau von Orleans*; Goethe, *Herman und Dorethea*; Ludwig, *Zwischen Himmel und Erde*.

The two hour course is based on Pope's German Composition, and is intended to be a practical course in German composition and conversation.

I. Elementary French

I. The course lays especial stress on those difficulties which usually confront the beginner in French. It involves drill in pronunciation, orthography and the elements of grammar, with practice in composition and translation.

Fraser and Squair's Grammar (Part I) with such texts as Daudet's *Trois Contes Choisis*, Dumas' *Chateau D'If* (from *Monte Cristo*) and *Le Voyage de M. Perrichon*, Labiche, etc.

Five hours per week during the year.

Course II. The work of this course includes the study of French syntax, oral translation of English into French, composition and the translation of French prose and poetry.

Merimee's *Colomba*, About's *La Mere de la Marquise*, Augier et Landeau's *Le Gendre de M. Poirier*, Moliere's *L'avare*, etc.

PHYSICS

The department of physics is well equipped with apparatus for lecture demonstrations and for laboratory work in both preparatory and college physics.

Physics is the foundation of all engineering work and a knowledge of its principles is necessary for an understanding of advanced chemistry, astronomy, geology, agriculture, and the biological sciences. Nearly all natural phenomena may be explained by the principles of physics. This shows the far-reaching importance of the subject. Not only the engineer, the chemist, the astronomer and the biologist, but also the farmer, and the man or woman who wishes to have an intelligent idea of the natural world around him or her, should know at least the elements of this subject.

In the preparatory course, the work consists of lectures, recitations and laboratory work. Many of the laboratory experiments are quantitative and the pupil is taught to make

accurate measurements and to write up the results of his work in a clear, neat and systematic manner.

The course in college physics includes mechanics, heat, sound, light, magnetism, and electricity. It covers the same ground as the preparatory course; but the work is more advanced, the treatment is more thorough, and mathematics is used more extensively. In the laboratory the students are given a high grade of apparatus to work with and they are required to get accurate results. Much use is made of curves to show the result of the experiments.

In both the preparatory and college physics, the practical applications of the subject are kept constantly in mind.

The following courses in physics are offered:

a. Elementary Physics

This is the equivalent of the first term's work in physics magnetism, sound and light. It is the equivalent of the regular high school course in physics and is required for admission to Physics I.

Three lectures or recitations and two double laboratory periods per week through the year.

Prerequisites: Algebra and Geometry.

b. Mechanics and Heat

This is the equivalent of the first term's work in physics (a), but the practical side is especially emphasized.

Required of students taking the short course in electrical or mechanical engineering.

c. Electricity and Magnetism

This course covers the same ground as the second term's work in physics (a). The practical applications are kept constantly in mind and the work is designed as an introduction to the short course in elementary electrical engineering.

Required of students taking the short course in electrical or mechanical engineering.

d. Sound and Light

This course covers the same ground as the third term's work in physics (a), and is required of students taking the Secondary course.

I. College Physics

This is a course in general physics and is required of those taking the regular Mechanical or Electrical Engineering course.

Three lectures or recitations and two double laboratory periods.

Carhart's College Physics.

Five hours per week through the year.

Prerequisites: Physics (a) and Math. I.

SHOP WORK

In the shop will be found 15 Sturtevant cast iron forges, each connected to the powerful blast and exhaust fans to furnish the necessary blast and carry off the smoke and gases which are so disagreeable if not properly taken care of. All the necessary tools are furnished by the department. The shop is well lighted, steam heated, and has cement floors so that it may be kept neat and clean.

For the work in joinery and pattern making the following equipment is provided, viz: Rip and cut-off circular saws, band-saw, a bench trimmer, five speed lathes and one pattern-maker's lathe with the usual chisels and gouges, nine improved manual training benches with quick-acting vises and drawers containing the necessary tools for the work required.

The machine shop is furnished with one 14 inch by 6 feet Flather engine lathe, one 10 inch by 4 feet Sebastian engine lathe, a 16 inch Flather shaper, a 20 inch Barnes upright drill, a 22x24 inch Cincinnati iron planer, a No. 2 Kempsmith milling machine, an emory grinder, grindstone, and the necessary tools, vices, etc., for the successful carrying on of the work.

The engineering laboratory is provided with several types of engines both throttling and automatic, and for the work in

traction engineering a traction engine is provided. Several makes of gasoline engines are available. The laboratory work will include tests on different types of engines to determine the power developed, economy of operation, etc. All necessary gauges, indicators, and other instruments of precision will be provided.

For the study of the strength of materials, a 50,000 lb. tension and compression machine is provided, and for tranverse testing of beams, bars, etc., a suitable machine will be furnished.

I. Joinery and Pattern Making

The use and care of wood working tools and machinery, speed lathe and bench work and practices used in making machine patterns, castings, flasks, etc.

The work in joinery includes a series of joints and exercises intended to give the student practice and skill in the use of ordinary bench tools. The wood lathe work gives them an idea of the capabilities of that machine and the pattern work is made as practical as possible with the intention of giving the student a clear understanding of the actual shop practice used in the making of patterns.

First year 240 hours.

II. Blacksmithing

The use of tools usually found in a well arranged shop forging in iron and steel, welding, tempering, tool dressing, etc. The object of the course is to give the student practice in working iron and steel in the forge.

First or second year, 90 hours. Winter term.

III. Machine Work

Filing, clipping, the operation of engine lathes, shaper, drill press, etc., finishing, polishing and machine construction. Second year, 270 hours.

IV. Carpentry and Building

The course embraces a variety of bench work, which brings into use all the tools commonly used in the trade. It is necessary

that the student first obtain a knowledge of how to properly use his tools and how to care for same. Great care is taken that each student acquires a workmanlike use of the various tools, and that he understands how to keep them in fit condition for work.

Continuing in the course, the student is taught how to lay out and construct centers and window frames; make, case and hang doors; lay beams and set bridging in same; erect and stud partitions and lay flooring. A complete course in joinery work is also given.

In addition to the work outlined the course includes house construction and framing. Although the lack of space prevents the erection of a frame house of full dimensions, the same attention is devoted to all the details of construction as would be required in similar work on a larger scale. In work of this kind, the pupils obtain a knowledge of the erection of framing for a house; also of sheathing and shingling. The window frames sashes, doors, etc., are all made and set in position by the young men.

Lectures imparting the scientific features of the trade are also given during the progress of the course.

V. Bricklaying and Plastering

In the bricklaying classes the young men are taught first how to handle the trowel and how to spread mortar.

The manual instruction in bricklaying includes the building of 8, 12, 16, and 20 inch straight walls; return corners and intersecting walls; piers, arches, fireplaces and flues; setting window frames, sills and lintels; blocking, toothing and corbelling. Fire-proof brickwork will also be included in the course. The manner of laying solid, hollow and annular slabs, and how fitted into beams, walls, floors and arches, will be taught.

The scientific instruction will be upon the properties of mortar and cement, and how they should be mixed. Arches: their various styles, and the advantages of each. Flues: their construction and utility. Foundations, walls, bonding, etc.

The course in plastering is arranged for beginners as well as those who are working at the trade. To the apprentice, particularly, this course presents many advantages, as little or no opportunity is given in the trade at large to learn cornicing.

The course includes lathing, scratch and brown coat work, hard finishing and cornicing.

VI. Plumbing and Steam Fitting

In the practical part of the course the students will be taught how to set and connect different kinds of radiators, and how to make the various kinds of coils in common use, such as return coils, miter coils, corner coils, etc. These coils are constructed in various sizes, three quarters to two inch pipe being used. Then follows instruction in piping of dwellings, and the buildings, and the various systems of heating, such as steam one pipe, steam two pipe, hot water, direct-indirect, and high and low pressure, are each erected in turn. The students are given a set of plans and on these plans are drawn the actual heating arrangement that would be required for a building of the kind represented. The measurement of each piece of pipe is taken from the plan, and the fittings, valves and other fixtures required to make a complete job are used in the construction of the work. In the workshop there is an arrangement of girders and beams to which the work is suspended, the pipes being run with a proper pitch the same as would be demanded in actual practice. On the completion of each job, connection is made with one of the steam lines of the school, and the work which has been erected receives a thorough test.

The scientific instruction consists of lectures on the principles of steam and hot water heating. The lectures will include the following subjects: Tools, fittings and pipe; general heating; low pressure steam, indirect steam heating; single pipe low pressure steam; hot water heating; high pressure steam heating; steam power plant; exhaust heating; power fan or blower system of steam heating and ventilating.

VII. Practical Electricity

The laboratory practice in this course will include:

Signal System

Wire splicing—soldering—bell and annunciator installation, fire and burglar alarms—telephone and telegraph circuits—automobile wiring.

Edison Three Wire System

Methods of obtaining the three wire system—wire calculations for the same—balancing a three wire system—effect of unbalancing.

Interior Wiring

In this department the student is given practice in installing knob and tube wiring—iron conduit with conduit fittings—wood and metal moulding, together with the installation of receptacles, sockets, fixtures, etc. All work to be done strictly in accordance with the rules of the Fire Underwriters.

Direct Current Apparatus

Connecting up shunt, series and compound machines, both generators and motors—speed control of motors—trouble locating. The student is required to connect up control apparatus, rheostats and dynamos in their proper relation, and put them in perfection operation.

Instrument Testing

Calibration of ammeters and voltmeters—wattmeter testing—connecting instruments on switch-board.

Alternating Current Machines

Connecting up one, two and three phase machines (both generators and motors) requirements for parallel operation—synchronizing A. C. generators and motors—connecting up control apparatus, rheostats and machines in their proper relation and putting same in perfect operation.

Transformer Connections

Delta and star connections—Scott transformation 2 to 3 phase or vice versa—quarter phase connection—auto transformer.

Electrical Appliances

Installation and operation of electric fans, toasters, stoves, signs, flashers, arc lamps and storage battery.

TRADES

The question of trade, or vocational courses is fast becoming a very important subject, and in offering courses of this kind the state school of Science does so after having given much time and thought to a careful study of the subject as a whole.

As a result of this investigation it has seemed best to outline courses in the various trades which shall include a sufficient number of subjects intended to broaden the intellect and, in a general way, widen the horizon of the student to the end that he may finish the course and come out not only a good carpenter or plumber as the case might be, but also a good citizen of the commonwealth. He will also have secured a basis or working foundation upon which he may build his own destiny.

For the reasons given above and others which could be given were it necessary, the trade courses thus far offered have been made two year courses of nine months each, feeling secure in the belief that in no shorter time can a training of this kind be given.

The laboratory practice pertaining to the particular course or trade chosen will be full sized work as much as possible and it is intended to give and require as much of this full sized work as possible in the time allotted to that part of the course.

COURSE IN CARPENTRY AND BUILDING

(Two years of nine months each)

First Year

FALL TERM	WINTER TERM	SPRING TERM
English	English	English
Elemen. Alg.	Elemen. Alg.	Elemen. Alg.
Physics	Physics	Physics
Political Science	Industrial Oppor.	Sociology
Drawing I	Drawing II	Drawing III
Joinery and Wood Turning	Framing	Carpentry

Second Year

FALL TERM	WINTER TERM	SPRING TERM
Indus. Hist.	Civics	Economics
Plane Geom.	Plane Geom.	Solid Geom.
Ind. Hygiene and Sanitation	Com. Law	Estimating Con't and Spec.
Detail Drawing	Detail Drawing	Detail Drawing
Carpentry	Carpentry	Carpentry

In this course the student, after learning the use and care of wood-working tools and the elements of joinery, takes up the special phases of carpentry, including construction of frames, cutting of rafters, stair building, casings, etc., with some practice in actual building, and details in house construction.

The course embraces a variety of bench work which brings into use all the tools commonly used in the trade. It is necessary that the student first obtain a knowledge of how to properly use his tools and how to care for same. Great care is taken that each student acquires a workman-like use of the various tools, and that he understands how to keep them in fit condition for work.

The student is taught how to lay out and construct centers and window frames; make, case and hang doors; lay beams and set bridging in same; erect and stud partitions and lay flooring. A complete course in joinery work is also given.

In addition to the work outlined the course includes house construction and framing. Although the lack of space prevents the erection of a frame house of full dimensions, the same at-

tention is devoted to all the details of construction as would be required in similar work on a larger scale. In work of this kind, the pupils obtain a knowledge of the erection of framing for a house, also of sheathing and shingling. The window frames, sashes, doors, etc., are all made and set in position by the young men.

Lectures imparting the scientific features of the trade are also given during the progress of the course.

Drawing for carpentry and building includes simple and oblique projection applied to construction of wood; plan and elevation of buildings; framing plans of roof; trusses; floor plans; layout of mills and location of machinery; details of open and boxed cornices, gutters, window and door frames for frame and brick buildings; interior trim; details of cabinet work, mantels and wainscoating; development of rake and level moldings, cornices, brackets and groins, circular head over recess and splayed jambs; problems in stair building and handrail enlargement; tracing; blueprinting; free-hand perspective drawing.

BRICKLAYING AND PLASTERING

First Year

FALL TERM	WINTER TERM	SPRING TERM
English	English	English
Mathematics	Mathematics	Mathematics
Physics	Physics	Physics
Political Science	Industrial Oppor.	Sociology
Drawing	Drawing	Drawing
Shop	Shop	Shop

Second Year

FALL TERM	WINTER TERM	SPRING TERM
History	Civics	Economics
Mathematics	Mathematics	Mathematics
Industrial History	Business Law	Estimating and Costs
Industrial Hygiene and Sanitation	Chemistry	Plan and Specification Writing
Drawing	Drawing	Drawing
Shop	Shop	Shop

In this course the student is given practical work in mixing mortars and cements, the methods of laying brick, the building of walls and flues, the making of angles, corners, offsets, etc., and in applying rough and smooth plaster coats and wall finishes.

In the bricklaying classes the young men are taught first how to handle the trowel and how to spread mortar. The manual instruction includes the building of 8, 12, 16 and 20 inch straight walls; return corners and intersecting walls; piers, arches, fireplaces and flues; setting window frames, sills and lintels; blocking, toothing and corbelling. Fireproof brickwork will also be included in the course. The manner of laying solid, hollow and annular salbs, and how fitted into beams, walls, floors and arches, will be taught.

The scientific instruction will be upon the properties of mortar and cement, and how they should be mixed. Arches, their various styles, and the advantages of each. Flues: their construction and utility. Foundations, walls, bonding, etc.

The course in plastering is arranged for beginners as well as those who are working at the trade. To the apprentice, particularly, this course presents many advantages, as little or no opportunity is given in the trade at large to learn cornicing. The course includes lathing, scratch and brown coat work, hard finishing and cornicing. Detail Drawings of chimneys, arches, cornices, etc.; plans, elevations, and sections of houses, flat buildings, and other structures will be required.

PLUMBING AND STEAM FITTING

(Two years of nine months each)

First Year

FALL TERM	WINTER TERM	SPRING TERM
English	English	English
Elemen. Alg.	Elemen. Alg.	Elemen. Alg.
Physics	Physics	Physics
Political Science	Industrial Oppor.	Sociology
Drawing I	Drawing II	Drawing III
Gas Fitting	Pipe Fitting	Soil Pipe Fitting

Second Year

FALL TERM	WINTER TERM	SPRING TERM
Indus. Hist.	Civics	Economics
Plane Geom.	Plane Geom.	Plane Geom.
Ind. Hygiene and Sanitation	Chemistry	Estimating Con't and Spec.
Detail Drawing	Com. Law	Detail Drawing
Joint Wiping	Detail Drawing	Roughing and Finishing work
	Joint Wiping	

In the practical part of the course the student will be taught how to set and connect different kinds of radiators, and how to make the various kinds of coils in common use, such as return coils, miter coils, corner coils, etc. These coils are constructed in various sizes, three quarters to two inch pipe being used. Then follows instruction in piping of dwellings and other buildings, and the various systems of heating, such as steam one pipe, steam two pipe, hot water, direct-indirect, and high and low pressure, are each erected in turn. The students are given a set of plans and on these plans are drawn the actual heating arrangement that would be required for a building of the kind represented. The measurement of each piece of pipe is taken from the plan, and the fittings, valves and other fixtures required to make a complete job are used in the construction of the work. In the workshop there is an arrangement of girders and beams to which the work is suspended, the pipes being run with a proper pitch the same as would be demanded in actual practice. On the completion of each job, connection is made with one of the steam lines of the school, and the work which has been erected receives a thorough test.

The scientific instruction consists of lectures on the principles of steam and hot water heating. The lectures will include the following subjects: Tools, fittings and pipe; general heating; low pressure steam; indirect steam heating; single pipe low pressure steam; hot water heating; high pressure steam heating; steam power plant; exhaust heating; power fan or blower system of steam heating and ventilating.

Drawing includes drafting entire plumbing plans for dwellings, stores, and apartment houses, including floor plans, elevations, and plans for heating, gas, ventilation, sewage, water supply.

TRADE COURSE IN PRACTICAL ELECTRICITY

The trade course in Practical Electricity designs to give the student actual practical work in installing and operating the im-

portant kinds of electrical apparatus. The theoretical side of the subject will be given proper attention. Considerable attention will be given to the application of the National Fire Underwriters' Code to wiring, so that the student will become familiar with these requirements on all kinds of wiring for lighting or power purposes.

In this course the necessary points regarding installation and operation of dynamos and motors both for direct and alternating current will be considered.

A graduate of this course would be able to properly install a call bell, private telephone or telegraph, or properly wire a dwelling or small power plant.

An outline of the subjects considered is as follows:

First Year

FALL TERM	WINTER TERM	SPRING TERM
English	English	English
Algebra	Algebra	Algebra
Physics (a)	Physics (a)	Physics (a)
Political Science	Industrial Oppor.	Sociology
Drawing I	Drawing II	Electric Wiring
Shop (wood)	Shop (forge)	Drawing II.
		Shop (machines)

Second Year

FALL TERM	WINTER TERM	SPRING TERM
Industrial History	Civics	Economics
Plane Geometry	Plane Geometry	Solid Geometry
Industrial Hygiene and Sanitation	Business Law	Estimating, Contracts and Specifications
Elect. Eng. II	Practical Electricity	Practical Electricity
Electrical Drawing	Electrical Drawing	Electrical Drawing
Elect. Laboratory		Electrical Laboratory

In addition the following are included in each of the trade courses:

Estimating and Cost

Estimating the cost of materials, fixtures, labor and figuring discounts for each trade.

Plans and Specifications

Practice in drawing and writing the necessary specifications from plans for the different structures and constructions of the trade.

THE WAHPETON CONSERVATORY OF MUSIC

As there are frequent inquiries by students of the State School of Science for courses in music the announcement of the Wahpeton Conservatory of Music is given in this catalogue.

It is the aim of the conservatory to make of itself an educational institution, solely, and it expects to do the most thorough fundamental work possible, for without this, no student can ever attain any degree of virtuosity and musicianship. The courses of study in piano forte, voice culture, violin and theory embrace practically all of the standard musical literature of these branches.

Not all music students would become teachers or public performers, therefore students are enrolled under two general heads, *Regular*—those following the regular prescribed course, and *Special*—students whose studies are selected to suit their individual needs and aims. To each class the very best efforts regardless of age or advancement is given. Of all students, regularity, punctuality and earnestness are demanded.

Faculty

The teachers are selected because of their broad education and special fitness for their positions. Most of them have enjoyed years of study with the best American and European instructors and have been successful teachers in various American conservatories for some time.

School Year

The conservatory year is forty (40) weeks, and divided into four terms of ten weeks each. Students may enroll at any time and continue for the unexpired portion of that term, paying only for the weeks of enrollment.

Branches

The Conservatory now offers courses of instruction in the following branches:

Art, piano, voice culture, violin, cornet and band instruments, harmony, counterpoint, canon and fugue, history of the development of music and of the lives of our greatest composers.

School Classification

The Conservatory is divided into two departments, viz:

Preparatory.

Collegiate.

Students of every age are enrolled in the Preparatory Department where they remain until they have mastered the elements of notation and can play well grades 1-2-3-4 and have a good and sufficient muscular and musical foundation for the easier work of Bach, Haydn, Mozart, Beethoven, Mendelssohn, Chopin and Schumann.

The Collegiate Department is divided into four parts designated as follows:

1st—Freshman.

2nd—Sophomore.

3rd—Junior—Teacher's Certificate.

4th—Senior—Diploma and Bachelor of Music Degree.

It is obvious that no time can be set for the completion of the above courses of study, because, whereas one pupil devotes four or five hours per day to practice and takes two or three lessons per week, another spends but three or four hours per week in study and takes but one weekly lesson. A student's former preparation, natural aptitude, earnestness, perseverance, etc., is taken into account. It is suggested that the Freshman, Sophomore and Junior courses can each be completed in one school year under the most favorable conditions. The Senior course will probably always require two full years.

Lesson Plans

Piano, voice and violin instructions are given in private lessons. Theory and history of music are taught in small classes. Outlines of the complete courses of study for each branch, will be furnished upon application.

Certificates and Diplomas

Merit cards will be awarded to students completing the Preparatory Department courses of study. Students who satisfactorily complete the Freshman, Sophomore or Junior courses will receive a suitable certificate. A Degree of Bachelor of Music is conferred upon all who complete the Senior course.

Recitals and Concerts

Students' Rehearsals, Recitals and Concerts will be given from time to time during the school year as occasion demands. Students of all grades participate in the Rehearsals, and only students may attend. The numbers for the recital programs will be selected from the material developed in the Rehearsals. Recitals are open to students and their friends. Open public concerts in turn, will be given by the best performers who have appeared in the Rehearsals and Recitals. Thus by constant and gradual progression, students are prepared to appear at their best in public concerts. The public will be invited to hear these programs.

Choral Practice

The Wahpeton Oratorio and Operatic Society of eighty voices plans to present special oratorio about Christmas time each year. A ladies chorus of fifty voices will be organized early in the first term and a good program will be prepared as soon as convenient. All students who have had sufficient training are invited to participate in these organizations.

Orchestra

Plans are being made to bring together a large number of orchestra performers of sufficient ability to perform the easier classical symphonies and overtures, assist with piano and violin concertos, and play accompaniments for the Oratorio Society. Special inducements are offered orchestra players. (Write for particulars).

Social Functions

The social life of school takes away the sting of hard, incessant labors, and makes life of the students away from home more bearable and pleasant. Once each month the Conservatory Faculty will entertain its students and friends in an "Open House Recital." A short program will be given and the balance of the evening devoted to social festivities.

Tuition

Tuition rates range from \$5.00 to \$15.00 per term according to the instructor.

General Information

Tuition is payable in advance by the term. By special arrangement, however, it may be made payable by the half term in advance.

No students will be enrolled by the lesson, or for a shorter period than the unexpired portion of that term.

Lessons missed through the neglect of students will not be made up. Lessons missed through illness, if the teacher is notified in advance, will be made up during that term. Slight indisposition, visitors, extra home or social duties and bad memory are not satisfactory excuses for missing lessons.

All regular students are expected to attend the various Rehearsals, Recitals and Concerts given by the school. All adult students are invited to join the History of Music classes. They are free.

For further information address the Director of the Conservatory, Wahpeton, N. D.

LIST OF STUDENTS

Abraham, Walter.....	Hankinson, N. D.
Anderson, Gena.....	Galchutt, N. D.
Anderson, Inez.....	Duluth, Minn.
Anderson, Louis.....	Steele, N. D.
Anderson, Ranvie.....	Galchutt, N. D.
Andrews, Neal B.....	Oakes, N. D.
Arbuckle, Hazel.....	St. Paul, Minn.
Assad, Ossiff.....	Wahpeton, N. D.
Bakken, Clarence.....	Abercrombie, N. D.
Beatty, Harold.....	Wahpeton, N. D.
Beaulieu, Alyce.....	Government Indian School
Beaulieu, Ida.....	Government Indian School
Beaulieu, Marguerite.....	Government Indian School
Bellanger, Clement.....	Government Indian School
Bellanger, George.....	Government Indian School
Berg, Martin.....	Morris, Minn.
Berg, Sena.....	Morris, Minn.
Birkhofer, Antonia.....	Alexandria, Minn.
Birkhofer, Freda.....	Alexandria, Minn.
Bladow, Fred.....	Hankinson, N. D.
Bladow, Otto	Hankinson, N. D.
Bonner, Mahlon D.....	Columbus, Neb.
Bordsen, Carl.....	Alexandria, Minn.
Bondurant, Arthur W.....	Alexandria, Minn.
Brecke, Arthur.....	Milnor, N. D.
Bridston, Lydia.....	Roth, N. D.
Bruce, Elmer.....	White Rock, S. D.
Budack, Tillie.....	Wahpeton, N. D.
Burfeind, Ed. C.....	Tyler, N. D.
Burfeind, Emma.....	Wheaton, Minn.

Bute, Lester.....	Doran, Minn.
Butterfield, Cecelia.....	Government Indian School
Byerly, Donald.....	Breckenridge, Minn.
Caswell, Gladys.....	Clayton, Wis.
Caulkins, Earl.....	Hankinson, N. D.
Chelgren, Herman.....	White Rock, S. D.
Chezik, Alice.....	Wahpeton, N. D.
Chezik, Lettie.....	Wahpeton, N. D.
Chipera, Pauline.....	Breckenridge, Minn.
Christy, Avis.....	Walcott, N. D.
Clark, Robert W.....	Lidgerwood, N. D.
Czichotzki, Clara.....	Wolverton, Minn.
Dahlstrom, Frederick.....	Herman, Minn.
Davison, Ray R.....	Tintah, Minn.
Demoray, Edward.....	Wahpeton, N. D.
Denardo, Michael.....	Fall River, Mass.
Dietz, Oscar.....	Wahpeton, N. D.
Dolezal, Margaret.....	Lidgerwood, N. D.
Dominick, Leo.....	Breckenridge, Minn.
Donahue, John.....	Wahpeton, N. D.
Early, Raymond.....	Wahpeton, N. D.
Eder, Laura.....	Breckenridge, Minn.
Egan, Edward.....	Tyler, N. D.
Egan, Leo.....	Tyler, N. D.
Ellis, Shirley.....	Wahpeton, N. D.
Empie, Anna.....	Breckenridge, Minn.
Erickson, Emma.....	Dalton, Minn.
Erickson, Melvin.....	Wahpeton, N. D., R. F. D.
Field, Amelia.....	White Rock, S. D.
Fiske, Olaf.....	Colfax, N. D.
Flaa, Axel.....	Christine, N. D.
Flaa, Ingvald.....	Abercrombie, N. D.
Fladby, Esther.....	Mooreton, N. D.
Forbes, Arnold.....	Wahpeton, N. D.
Forkner, Donna.....	Wahpeton, N. D.

Forman, Alfred.....	Wahpeton, N. D.
Forman, Arthur.....	Wahpeton, N. D.
Formaneck, Fred.....	Wahpeton, N. D.
Formaneck, W. M.....	Wahpeton, N. D.
Frank, Eleda.....	Duluth, Minn.
Frederick, Theodore.....	Wahpeton, N. D.
Frogner, Cora.....	Iola, Wis.
Gewalt, Carl H.....	Breckenridge, Minn.
Gillis, Gilbert.....	Wahpeton, N. D.
Goettlemann, Herbert.....	Wahpeton, N. D.
Granbois, Walter.....	White Rock, S. D.
Gregg, Christine.....	Wahpeton, N. D.
Grohman, Tillie.....	Abercrombie, N. D.
Gromboise, Emily.....	Government Indian School
Gully, Frank.....	Wyndmere, N. D.
Gully, Nick.....	Hankinson, N. D.
Gunderson, Selma.....	Christine, N. D.
Gunness, Clarence.....	Abercrombie, N. D.
Gylland, Christine.....	Abercrombie, N. D.
Haas, Jake.....	Lidgerwood, N. D.
Hagness, Minnie.....	Milnor, N. D.
Hamann, Ben A.....	Sykeston, N. D.
Hamer, Elsie.....	Dwight, N. D.
Hanson, Manda.....	Landa, N. D.
Hasty, Clayton.....	Tyler, N. D.
Hausken, Arthur.....	Wahpeton, N. D.
Hegre, Beulah.....	Lake Park, Iowa
Heine, Walter.....	Wahpeton, N. D.
Hektner, Adina.....	Mooreton, N. D.
Hektner, Emelia.....	Mooreton, N. D.
Hendrickson, Bernice.....	Colfax, N. D.
Henry, Shirley B.....	DeLamere, N. D.
Herman, Charles.....	Marlowe, S. D.
Hermo, Ida.....	Wahpeton, N. D.
Hill, Helen.....	Minneapolis, Minn.

Hineck, Alma.....	Great Bend, N. D.
Hineck, Ida.....	Great Bend, N. D.
Hobson, J. C.....	Abercrombie, N. D.
Hodgson, Walter.....	Herman, N. D.
Hoffman, Carl.....	Wahpeton, N. D.
Huss, Lawrence.....	Mooreton, N. D.
Jacobson, Elmer.....	Dwight, N. D.
Jamieson, Mabel.....	Wahpeton, N. D.
Janke, Ruby.....	Tenney, Minn.
Jeanotte, Maria.....	Government Indian School
Johnson, Bernt.....	Homestead, N. D.
Johnson, John A.....	Christine, N. D.
Jollie, Margarette.....	Government Indian School
Kimball, Viola.....	Gatzke, Minn.
King, Leah.....	Government Indian School
King, Marie.....	Government Indian School
Klein, Leo.....	Hancock, Minn.
Knudson, Allie.....	White Rock, S. D.
Kraemer, Lucy.....	Alexandria, Minn.
Kramer, Robert.....	Wahpeton, N. D.
Kubela, Addie.....	Breckenridge, Minn.
Larson, Florence.....	Alexandria, Minn.
Larson, Laurence.....	Kindred, N. D.
Lauder, Max.....	Wahpeton, N. D.
Leeson, Hubert P.....	Herman, Minn.
Lien, Minnie.....	Milnor, N. D.
Lillegard, Ebba.....	Wahpeton, N. D. R. F. D.
Littel, Grace.....	Breckenridge, Minn.
Little, Jas. E.....	Wyndmere, N. D.
Lodahl, Arthur.....	Abercrombie, N. D.
Lord, Harry.....	Morris, Minn.
Lutovsky, Anton.....	Veseleyville, N. D.
Manikowski, Julia.....	Mooreton, N. D.
Marsh, Elsie.....	Hankinson, N. D.
Mathison, Ellen.....	DeLamere, N. D.

Mathiesen, Minnie.....	Dwight, N. D.
Mauseth, Severt.....	Colfax, N. D.
McCarty, Sarah.....	Wahpeton, N. D.
McCarty, Winnifred.....	Wahpeton, N. D.
McKercher, Mirl.....	Sioux City, Ia.
Meyer, Alvin.....	Wahpeton, N. D.
Moody, Claude.....	Wahpeton, N. D.
Morris, Clarence.....	Wahpeton, N. D.
Moyer, Zelma.....	Duluth, Minn.
Mumm, Marie.....	Lidgerwood, N. D.
Mussman, George.....	Foxhome, Minn.
Nelson, Ethel.....	Fairmount, N. D.
Nelson, Mabel.....	Havana, N. D.
Nelson, Sarah.....	Fairmount, N. D.
Ness, Vera.....	Wahpeton, N. D. R. F. D.
Newby, Ruby.....	Fairmount, N. D.
Norton, Harold.....	Breckenridge, Minn.
Nyberg, Alyce.....	Duluth, Minn.
Nypen, Alma.....	Abercrombie, N. D.
Oien, Otto.....	Wahpeton, N. D.
Olson, Barney.....	Wahpeton, N. D.
Olson, Clarence.....	Galchutt, N. D.
Olson, Ella.....	Dwight, N. D.
Olson, Mabel.....	Dwight, N. D.
Ouderkirk, Burton.....	Kent, Minn.
Pahl, Frank.....	Lidgerwood, N. D.
Peterson, Anna.....	Doran, Minn.
Peterson, Edgar.....	Walcott, N. D.
Piper, Althia.....	Scranton, N. D.
Piper, Ira.....	Wahpeton, N. D.
Popp, Hazel.....	Great Bend N. D.
Potter, Marion.....	Wahpeton, N. D.
Prall, Stella E.....	Fairmount, N. D.
Pratt, Mabel.....	Great Bend, N. D.
Prebelich, Peter.....	Breckenridge, Minn.

Quamme, Marie.....	Dwight, N. D.
Quamme, Myrtle.....	Dwight, N. D.
Quinn, John E.....	Wahpeton, N. D.
Quinn, Mabel.....	Wahpeton, N. D.
Radke, Leonard.....	Lidgerwood, N. D.
Reinke, Mildred.....	Hankinson, N. D.
Rettig, Frank.....	Wahpeton, N. D.
Rickert, Jos.....	Wahpeton, N. D.
Ripperton, Lyman.....	Foxhome, Minn.
Robertson, Katie.....	St. Cloud, Minn.
Rubish, Charles.....	Fairmount, N. D.
Ruddy, John C.....	Wahpeton, N. D.
Russell, Albert.....	Cogswell, N. D.
Rustad, Helmer.....	Dwight, N. D.
Sandbeck, Clara.....	Kindred, N. D.
Sanders, Ralph.....	White Rock, S. D.
Santer, Jennie.....	Sherburn, Minn.
Schiller, H. P.....	Great Bend, N. D.
Schiller, Margaret.....	Great Bend, N. D.
Schmidt, Peter.....	Enloe, N. D.
Schneider, Edward.....	Breckenridge, Minn.
Schramm, Wm. C.....	Hankinson, N. D.
Score, Clara.....	Walcott, N. D.
Sedivy, Mary.....	Breckenridge, Minn.
Sewrey, Paul E.....	Wahpeton, N. D.
Sigford, Lilian.....	Wheaton, Minn.
Simmons, Alma.....	Kindred, N. D.
Simmons, Susie.....	Kindred, N. D.
Simonsen, Paul.....	Wahpeton, N. D.
Skolas, Albert.....	Deerfield, Wis.
Skovholt, Oscar.....	Dwight, N. D.
Sletta, M. E.....	Mooreton, N. D.
Smith, Ernest.....	Tintah, Minn.
Snyder, Anna.....	Aberdeen, S. D.
Snyder, Ben J.....	Fergus Falls, Minn.
Sockness, Inga.....	Colfax, N. D.

Soule, Arthur.....	Dwight, N. D.
Staples, Isel.....	Breckenridge, Minn.
Starkey, Fred.....	Campbell, Minn.
Steffens, Henry.....	Fairmount, N. D.
Stern, Joseph.....	Wahpeton, N. D.
Stibal, Joseph.....	Lidgerwood, N. D.
Streeter, Gladys.....	Granite Falls, Minn.
Swank, Hazel.....	Wahpeton, N. D.
Swenson, George.....	Christine, N. D.
Syverson, Hilmar.....	Wahpeton, N. D. R. F. D.
Syverson, Syver	Homestead, N. D.
Tanner, Simon.....	Government Indian School
Tedin, Albert.....	White Rock, S. D.
Tetrault, Albert.....	Government Indian School
Tetrault, Clara.....	Government Indian School
Tiedemann, Henry.....	Wahpeton, N. D.
Tiseth, Mathilda.....	Abercrombie, N. D.
Tostenson, Tom.....	Colfax, N. D.
Tschakert, Lawrence.....	Kent, Minn.
Tschakert, Louis.....	Kent, Minn.
Twohig, James.....	Wahpeton, N. D. R. F. D.
Tyra, William.....	New Prague, Minn.
Ulsaker, Althea.....	Wahpeton, N. D.
Ulsaker, Carl.....	Wahpeton, N. D.
Ulsaker, Osear.....	Wahpeton, N. D.
Vaught, Claude.....	Steele, N. D.
Voelker, Lawrence.....	Wahpeton, N. D.
Walter, Niles A.....	Fairmount, N. D.
Wang, Inga.....	Fairmount, N. D.
Weimar, William.....	Wahpeton, N. D.
Wessel, Hazel M.....	Farmington, N. D.
White, Sam.....	Government Indian School
Wilson, Elda M.....	Underwood, Minn.
Wold, Olga.....	Walcott, N. D.
Wold, Sylvia.....	Galchutt, N. D.

Worner, Elroy.....	Great Bend, N. D.
Worner, Sadie.....	Great Bend, N. D.
Wright, Vallie.....	Wahpeton, N. D.
Yates, Hoyt.....	Wahpeton, N. D.
Youngdahl, Harry.....	Fairmount, N. D.
Zanzinger, Alma.....	Wahpeton, N. D.
Zeyher, Theodore.....	Wahpeton, N. D.

SUMMER SCHOOL STUDENTS--1913

Anderson, Ranvie.....	Galchutt, N. D.
Askerooth, Mae.....	Battle Lake, Minn.
Babcock, Ruth.....	Wahpeton, N. D.
Baily, Hazel.....	Lidgerwood, N. D.
Baily, Lenora.....	Lidgerwood, N. D.
Beach, Vera R.....	Wahpeton, N. D.
Bennett, Jessie A.	Paola, Kan.
Bleyhl, Cora.....	DeLamere, N. D.
Blouin, Carrie	DeLamere, N. D.
Bowman, Esther M.....	Wahpeton, N. D.
Bowman, Nellie I.....	Wahpeton, N. D.
Busness, Maybell.....	Breckenridge, Minn.
Campbell, Effie, D.....	Wyndmere, N. D.
Cassidy, Vernie.....	Graceville, Minn.
Craig, Ina.....	Colfax, N. D.
Dale, Gladys.....	Milnor, N. D.
DeSilva, Ethel A.....	Hankinson, N. D.
Diffley, Celia G.....	Collis, Minn.
Dolbear, Adda.....	Lidgerwood, N. D.
Durkee, Alta.....	Fairmount, N. D.
Duffy, Cornelia.....	Wyndmere, N. D.
Ecklie, Alma.....	Walcott, N. D.
Ellis, Hazel B.....	Wahpeton, N. D.
Ellis, Shirley L.....	Wahpeton, N. D.
Grant, Tilda J.	Kindred, N. D.
Haas, Sadi.....	Breckenridge, Minn.
Hamerlik, Anna.....	Wahpeton, N. D.
Hamerlik, Christine.....	Wahpeton, N. D.
Hansen, Clara M.....	Wahpeton, N. D.
Hardacre, Reba G.....	Lanark, Ill.
Haugen, Inga.....	Abercrombie, N. D.
Hegre, Beulah.....	Lake Park, Iowa.
Hendrickson, Leva.....	Colfax, N. D.

Hinderliter, Emma.....	Fairmount, N. D.
Hoff, Gunda.....	Abercrombie, N. D.
Hohngren, Ida.....	Breckenridge, Minn.
Holcomb, Alga.....	Wahpeton, N. D.
Hyland, Elizabeth.....	Graceville, Minn.
Johnson, Palma.....	Homestead, N. D.
Kittlestead, Anna.....	Doran, Minn.
Kjos, Inga.....	McLeod, N. D.
Knapp, Lavina.....	Fergus Falls, Minn.
Kramer, Jennie.....	Wahpeton, N. D.
Larson, Emma.....	Fergus Falls, Minn.
Lauder, Frances.....	Wahpeton, N. D.
Leavitt, Hazel.....	Wahpeton, N. D.
Lenoue, Mary.....	Kent, Minn.
Leshovsky, Della M.....	Tyler, N. D.
Leslie, Jessie.....	Rollis, Minn.
Little, Kathryn.....	Hankinson, N. D.
Logsdon, Nellie.....	Kelso, N. D.
Louberg, Marie.....	DeLamere, N. D.
Louberg, Jennie.....	DeLamere, N. D.
Lund, Ethel.....	Breckenridge, Minn.
Mangskau, Agnes.....	Breckenridge, Minn.
Mareh, Josephine.....	Wahpeton, N. D.
Minnehan, Maryann.....	Fairmount, N. D.
McLellan, Hattie.....	Foxhome, Minn.
Meslow, Ida.....	Walcott, N. D.
Muir, Effie.....	Mooreton, N. D.
Murphy, Florence.....	Fairmount, N. D.
Nelson, Nora.....	Milnor, N. D.
Oberg, Mabel.....	Milnor, N. D.
Olerud, Alma.....	McLeod, N. D.
Oliver, Josie.....	Wahpeton, N. D.
Wier, Elsie.....	Campbell, Minn.
Williams, Ruth.....	Wahpeton, N. D.
Yates, Esther.....	Wahpeton, N. D.
Youngberg, Edith.....	Effington, S. D.

Oliver, James.....	Effington, S. D.
Oliver, Helen.....	Wahpeton, N. D.
Oliver, Nellie M.....	Sisseton, S. D.
Olson, Cora.....	Galchutt, N. D.
Olson, Ethel.....	Galchutt, N. D.
Olson, Julia.....	Kindred, N. D.
Overboe, Christine.....	Kindred, N. D.
Pezchacek, Frank.....	Wahpeton, N. D.
Perschbacher, Lillian.....	Breckenridge, Minn.
Pericle, Stella.....	Wishek, N. D.
Phalen, Kathryn.....	Graceville, Minn.
Phillipp, Zelima.....	Breckenridge, Minn.
Piper, Ray E.....	Wahpeton, N. D.
Quinn, Charles F.....	Wahpeton, N. D.
Reinke, Mildred.....	Hankinson, N. D.
Reiser, Fern.....	Campbell, Minn.
Russell, Anna.....	Cogswell, N. D.
Sampson, Bessie L.....	Wyndmere, N. D.
Sampson, Mabel T.....	Wyndmere, N. D.
Saumweber, Emma.....	Lidgerwood, N. D.
Shaffer, Hester.....	Campbell, Minn.
Schreiber, Genevieve	Breckenridge, Minn.
Sherman, Libbie.....	Wahpeton, N. D.
Simmons, Mabel.....	Kindred, N. D.
Simonsen, Bertha.....	Wahpeton, N. D.
Sockness, Inga.....	Colfax, N. D.
Solhjem, Bena.....	Power, N. D.
Stabnow, Kathryn.....	Breckenridge, Minn.
Stevenson, Mrs. May.....	Fairmount, N. D.
Thompson, Ida.....	Wahpeton, N. D.
Thompson, Lulu.....	Wahpeton, N. D.
Unbaugh, Cornelius G.	Afton, Iowa
Van Arnam, Grace.....	Wahpeton, N. D.
Vollrath, Anna.....	Wahpeton, N. D.
Vought, Fannie.....	DeLamere, N. D.

ADDENDA

To meet the needs of those desiring a brief practical training for the garage or automobile repair, the following course has been added to the Engineering department:

Automobile Repairing and Adjustment**(One Year Course)**

FALL TERM	WINTER TERM	SPRING TERM
English	English	English
Elemen. Alg.	Elemen. Alg.	Elemen. Alg.
Physics	Physics	Physics
Gas. Eng.	Ignition Systems and Troubles	Self Starter
Drawing I	Drawing II	Drawing II
Mach. Shop	Forge Shop	Mach. Shop

(One Winter Term)

Theory of Gas Eng.
 Elec. and Magnetism
 Ignition System and Troubles
 Self Starters
 Forge Shop (one day per week)
 Mach. Shop (two days per week)
 Lab. Practice (two days per week)

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Hinderliter, Emma.....	Fairmount, N. D.
Hoff, Gunda.....	Abererombie, N. D.
Holmgren, Ida.....	Breckenridge, Minn.
Holcomb, Alga.....	Wahpeton, N. D.
Hyland, Elizabeth.....	Graceville, Minn.
Johnson, Palma.....	Homestead, N. D.
Kittlestead, Anna.....	Doran, Minn.
Kjos, Inga.....	McLeod, N. D.
Knapp, Lavina.....	Fergus Falls, Minn.
Kramer, Jennie.....	Wahpeton, N. D.
Larson, Emma.....	Fergus Falls, Minn.
Lauder, Frances.....	Wahpeton, N. D.
Leavitt, Hazel.....	Wahpeton, N. D.
Lenoue, Mary.....	Kent, Minn.
Leshovsky, Della M.....	Tyler, N. D.
Leslie, Jessie.....	Rollis, Minn.
Little, Kathryn.....	Hankinson, N. D.
Logsdon, Nellie.....	Kelso, N. D.
Louberg, Marie.....	DeLamere, N. D.
Louberg, Jennie.....	DeLamere, N. D.
Lund, Ethel.....	Breckenridge, Minn.
Mangskau, Agnes.....	Breckenridge, Minn.
Mareh, Josephine.....	Wahpeton, N. D.
Minnehan, Maryann.....	Fairmount, N. D.
McLellan, Hattie.....	Foxhome, Minn.
Meslow, Ida.....	Walcott, N. D.
Muir, Effie.....	Mooreton, N. D.
Murphy, Florence.....	Fairmount, N. D.
Nelson, Nora.....	Milnor, N. D.
Oberg, Mabel.....	Milnor, N. D.
Olerud, Alma.....	McLeod, N. D.
Oliver, Josie.....	Wahpeton, N. D.
Wier, Elsie.....	Campbell, Minn.
Williams, Ruth.....	Wahpeton, N. D.
Yates, Esther.....	Wahpeton, N. D.
Youngberg, Edith.....	Effington, S. D.

Oliver, James.....	Effington, S. D.
Oliver, Helen.....	Wahpeton, N. D.
Oliver, Nellie M.....	Sisseton, S. D.
Olson, Cora.....	Galchutt, N. D.
Olson, Ethel.....	Galchutt, N. D.
Olson, Julia.....	Kindred, N. D.
Overboe, Christine.....	Kindred, N. D.
Pezchacek, Frank.....	Wahpeton, N. D.
Perschbacher, Lillian.....	Breckenridge, Minn.
Pericle, Stella.....	Wishek, N. D.
Phalen, Kathryn.....	Graceville, Minn.
Phillipp, Zelima.....	Breckenridge, Minn.
Piper, Ray E.....	Wahpeton, N. D.
Quinn, Charles F.....	Wahpeton, N. D.
Reinke, Mildred.....	Hankinson, N. D.
Reiser, Fern.....	Campbell, Minn.
Russell, Anna.....	Cogswell, N. D.
Sampson, Bessie L.....	Wyndmere, N. D.
Sampson, Mabel T.....	Wyndmere, N. D.
Saumweber, Emma.....	Lidgerwood, N. D.
Shaffer, Hester.....	Campbell, Minn.
Schreiber, Genevieve	Breckenridge, Minn.
Sherman, Libbie.....	Wahpeton, N. D.
Simmons, Mabel.....	Kindred, N. D.
Simonsen, Bertha.....	Wahpeton, N. D.
Sockness, Inga.....	Colfax, N. D.
Solhjem, Bena.....	Power, N. D.
Stabnow, Kathryn.....	Breckenridge, Minn.
Stevenson, Mrs. May.....	Fairmount, N. D.
Thompson, Ida.....	Wahpeton, N. D.
Thompson, Lulu.....	Wahpeton, N. D.
Unbaugh, Cornelius G.	Afton, Iowa
Van Arnam, Grace.....	Wahpeton, N. D.
Vollrath, Anna.....	Wahpeton, N. D.
Vought, Fannie.....	DeLamere, N. D.

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Drawing I	Drawing II	Drawing II
Mach. Shop	Forge Shop	Mach. Shop

(One Winter Term)

Theory of Gas Eng.
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 Ignition System and Troubles
 Self Starters
 Forge Shop (one day per week)
 Mach. Shop (two days per week)
 Lab. Practice (two days per week)

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